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The AUTOMOBILE

Careful Design Gives Lightness

Weight Is Cut from Franklin Car By Careful Choice of Materials and By Elimination of Useless Metal

TO the engineer who is really desirous of learning the secrets of Franklin light weight automobile manufacture, the list of weights of parts and the drawings herewith are practically sufficient a story. The fact that the Franklin has an air-cooled engine probably helps the weight reduction, but each engineer must settle this for himself by making comparison with the weights of parts and assemblies from his own car.

Since the article Cutting the Weight which appeared in THE AUTOMOBILE for Aug. 5, the steady stream of correspondence has proved beyond any doubt, if indeed there was any beforehand, that light weight is the most desirable attribute of the automobile which it most commonly lacks at present, except in isolated instances. Much experiment on the speedways has shown that the weight factor is all-important in determining accelerative power, and that a few hundred pounds saved is the equivalent of quite a large increase in the cylinder capacity of the engine; also it is well known that tire wear and gasoline consumption are connected very intimately with weight.

What Is a Light-Weight Automobile?

There are three classes of automobile from the passenger capacity point of view. The largest is for seven, the medium for five and the smallest for two or three passengers, and it is desirable that there should be developed some notion as to just what is a commendably light weight for each of these three. Manufacturers who have aimed at the greatest luxury have paid the least attention to weight, so we find that the most expensive seven-passenger cars weigh from 4500 to 5000 lb. and the cheaper ones are very little lighter, the weight difference being made up of differences in equipment and in the solidity of accessories.

The five-passenger car is more difficult to place, as its weight varies much more, there being a wider choice of horsepowers than is obtainable in the seven-passenger class. But to make a carefully considered estimation it will be fairly close to 3500 lb. often heavier than this, and seldom lighter. At the other end of the scale, perhaps the Ford is the lightest of all with is approximate 1500 lb. in five-passenger form, and this car being a fairly good performer, there seems plenty of room between the average of 3500 lb. and the minimum of 1500.

When we come to two- and three-passenger jobs they are so seldom specially built that the weight runs almost as high as for the five-passenger, but signs are not wanting that there is a real demand for a three-passenger car which is loaded to capacity with this number of persons. Taking the very few examples that do exist, an average of about 1700 to 1900 lb. is obtained, so that the five-passenger Ford is a good deal lighter than most specially built two-passenger cars.

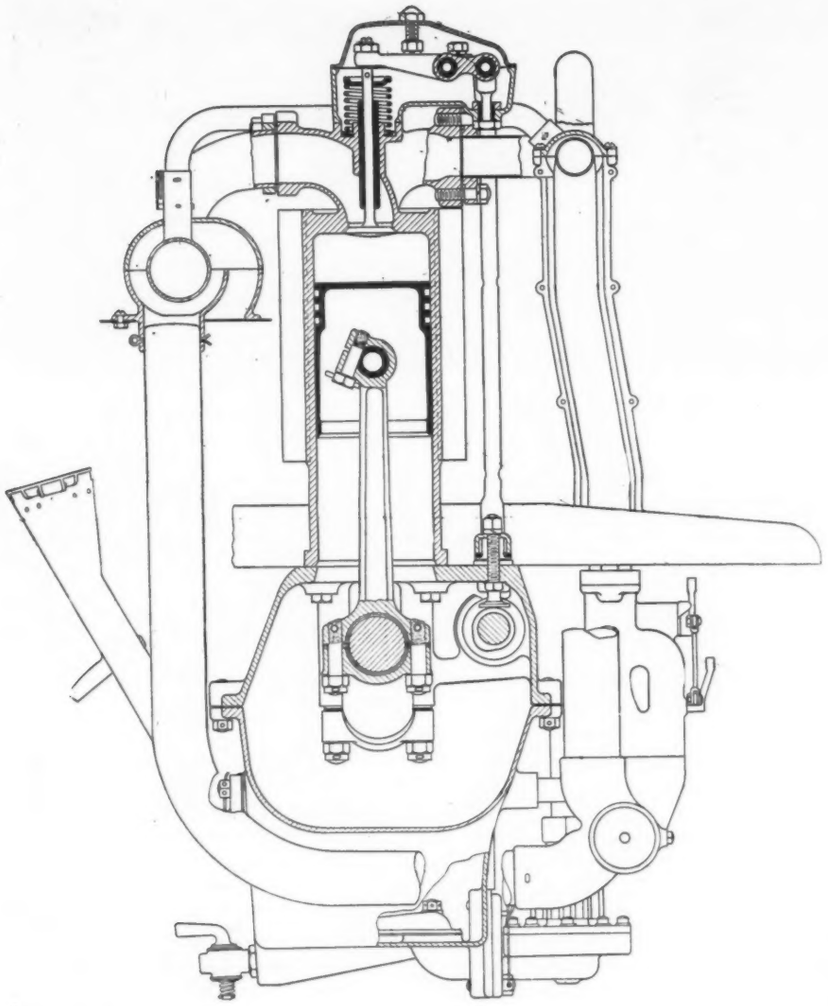
How then can it be said what is "light" and what is "heavy" when such amazing differences as this exist?

In any form of human striving it is always a help to have some target, to have some tangible goal. For the seven-passenger car it might be 3000 lb., for the five-passenger 2250 lb. and for the smallest class of car 1500 lb. The truest of all proverbs is "you never know what you can do till you try" and in weight cutting so few have tried as yet.

Franklin Pioneer in Lightness

Low weight has been a Franklin ideal for years and it is admitted by the company that however light their five-passenger car may be now they hope to make it still lighter as experience suggests new ways for saving. Allowing for manufacturing variations, which is always fairly large in the most carefully made chassis, the average weight of the 1916 Franklin car complete would be approximately 2600 lb. and this lightness is not obtained by any skimping of the essentials.

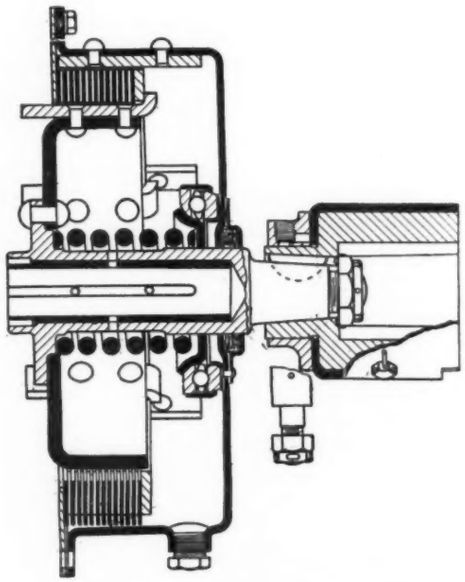
At the present moment the Franklin company is producing a series 8 car which is the same as the series 7, for which a number of detail weights are given, and it is easy to show the way in which weight is steadily cut out by quoting a few differences between the two series models. Using aluminum instead of steel for the fenders has permitted a *saving* of 38 lb. to be made. Substituting aluminum for steel in other places where sheet metal is used as for the running board shields and dashboard parts, has saved 30 lb. more. Careful analysis of the body construction has enabled wood and metal to the tune of 21 lb. to be eliminated without effect upon the strength, the capacity or the comfort. Redesign of the universal joints and the driveshaft has reduced the weight 5 lb. Just these few things have together cut 94 lb. from the weight and the extra cost is very little, so little that it



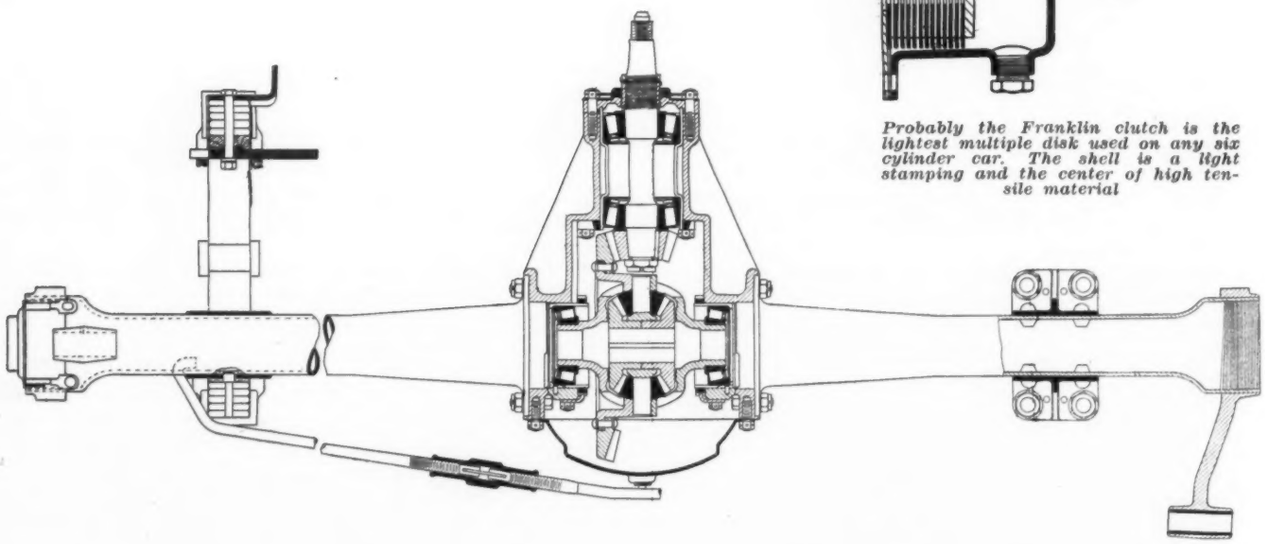
This section of the Franklin engine shows the amount of cast iron saved by the air cooling

Weight of Main Assemblies and Detail Parts of Franklin Series 7

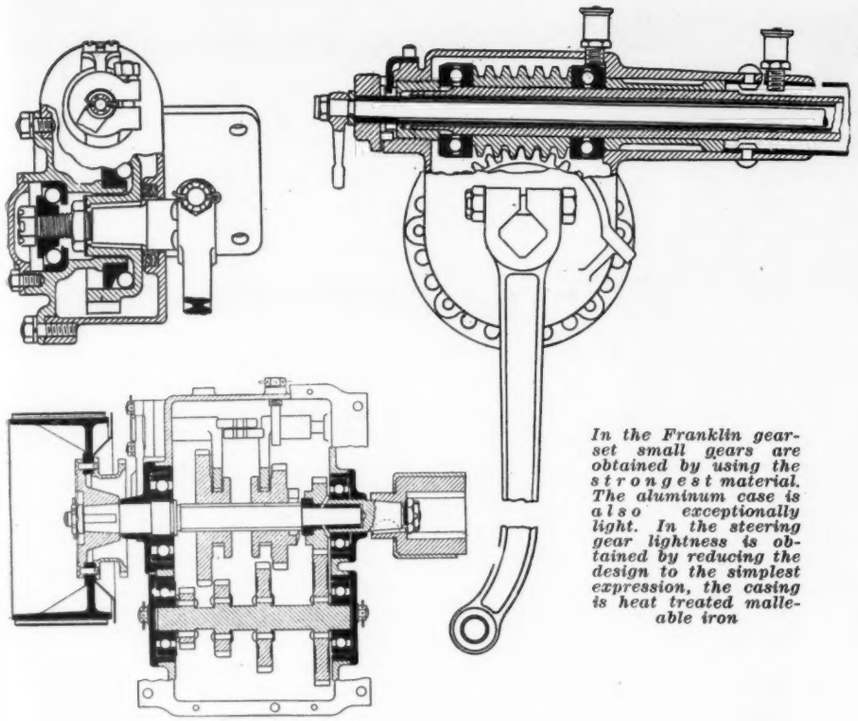
NAME PART OF CAR	WEIGHT M-7 Lb.	Oz.
Front axle	163	10
Rear axle	253	12
Transmission	133	1
Steering device	36	4
Engine	637	..
Sill with running boards	176	..
Running boards	23	4
	29	12
Front mudguards (1)	23	4
Rear mudguards (1)	13	8
Front wheel only (1)	42	..
Rear wheel only (1)	45	8
★Body	486	..
Glass front	30	14
Top dust cover	6	4
Top with curtains	73	10
Hood	35	6
Gasoline tank	25	4
Battery	85	2
Set of lamps	11	12½



Probably the Franklin clutch is the lightest multiple disk used on any six cylinder car. The shell is a light stamping and the center of high tensile material



Shows the construction of Franklin rear axle with thin, drawn steel tubes and aluminum die-cast differential housing. Observe the ingenious method of attachment for the outer ends of the tie rod

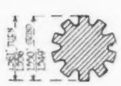


In the Franklin gearset small gears are obtained by using the strongest material. The aluminum case is also exceptionally light. In the steering gear lightness is obtained by reducing the design to the simplest expression, the casing is heat treated malleable iron

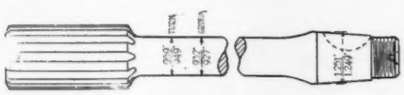
NAME PART OF CAR	WEIGHT M-7 Lb.	Oz.
Horn	3	10
Luggage carrier	16	2
Goodyear plain tire (1)	29	42
Goodyear non-skin (1)	32	13
Flywheel guard	5	2
Mud apron	5	8
Battery pan	..	13
Engine boot	27	8
Headlamp brackets (1)	3	4
Left toe board	2	8
Right toe board	7	9
Floor board	10	..
Sill finish strip (1)	2	2½
Front seat cushion	10	7
Rear seat cushion	27	8
Front seat cushion spring	4	11
Rear seat cushion spring	16	4
Complete equipment	32	..
ENGINE		
Oil baffle plate	..	1½
Valve lifter guide	..	5
Walking beam support cap	..	2¼
Oil pump drive shaft	..	8½
Walking beam support tube	..	6½
Engine rail (rear)	8	12½
Crankshaft bear. cap screw lock	..	2
Camshaft bushing (front)	..	11¼
Camshaft rear bearing cap bush.	..	4
Camshaft center bush (upper)	..	6¾
Camshaft center bush (lower)	..	6¾
Camshaft middle bush (lower)	..	3
Camshaft middle bush (upper)	..	2½
Camshaft front bush (lower)	..	6
Camshaft front bush (upper)	..	5
Camshaft rear bush (lower)	..	4¼
Camshaft rear bush (upper)	..	3¾
Camshaft bear. cap screw lock spacer	..	2½
Crankshaft	44	10
Suction yoke	6	4¾

★With top and glass front, with rear cushion, without front seats. No side curtains.

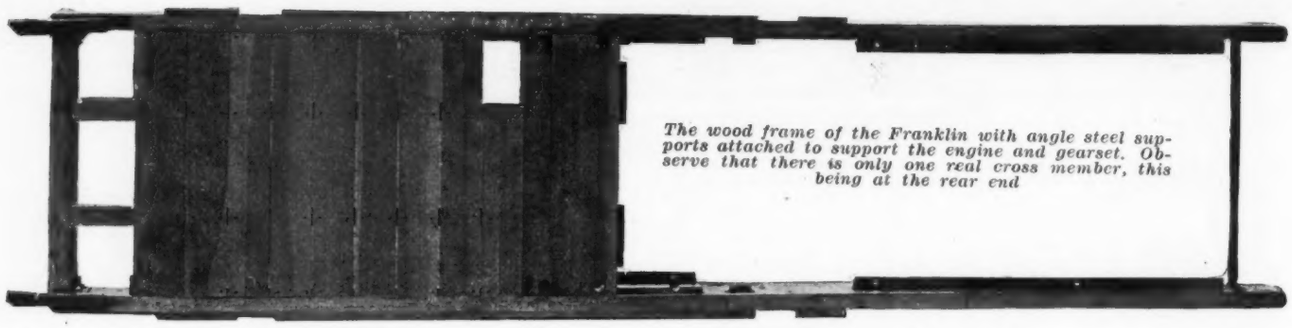
NAME PART OF CAR	WEIGHT M-7 Lb.	Oz.
Exhaust yoke	11	7½
Camshaft	10	7½
Starting crank shaft	..	14
Connecting-rod complete	2	10
Tire pump bracket (rear)	..	13
Tire pump bracket (front)	..	..
Valve lifter guide yoke	..	2½
Front engine rail	4	12
Starting crank shaft	..	14
Starter	53	10
Flywheel disk	6	1
Hot air pipe	2	..
Starting crank clutch	..	6
Cylinder jacket	..	15
Engine jacket complete	5	4
Walking beam stud	..	2½
Oil tank filler float rod	..	½
Carb. aux. air valve stem	..	¾
Throttle valve stem	..	1¼
Air control sleeve	..	3
Carb. lift valve	..	1¾
Cylinder comp. with valves, etc.	22	4½
Carb. base	1	5
Hot air box	..	15
Piston ring	..	1½
CHASSIS		
Trans. univ. block	2	5¼
Exh. yoke stuff. box nut	..	7¼
Univ. block pins	..	5¼
Univ. block pins bush	..	5½
Muffler tail pipe support	..	7
Muffler support	..	5½
Clutch trunnion con. rod	..	8½
Trans. sill angle iron	1	13
Engine sill angle iron	6	..



Dimensions show how using high tensile steel allows driveshaft weight to be cut



NAME PART OF CAR	WEIGHT M-7 Lb.	Oz.
Exhaust pipe	4	3
Foot lever shaft	2	9
Rear corner sill angle	..	14
Accel. bell crank shaft	..	2¼
Dash diaphragm	2	3
Engine jacket front	2	12
Sill	123	..
Running board complete (R)	23	4
Running board complete (L)	29	12
TRANSMISSION		
Low speed pinion	..	12½
Reverse idler gear	..	11¼
Sec. shaft inter. gear	2	1½
Sec. shaft driv. gear	3	10¼
Secondary gear shaft	2	4¼
Trans. engine clutch gear	2	2
Trans. engine shaft cap (front)	1	3¾
Trans. sec. shaft cap	1	2¼
High and int. shifter fork	1	7
Low and rev. shifter fork	1	6½
Trans. univ. shaft end	3	9½
Sliding gear shaft	3	9½
Reverse idler stud	..	8
Shifter fork guide	..	9½
Trans. univ. sleeve	1	9
Secondary shaft comp.	9	14
Trans. engine shaft cap (rear)	1	12
Trans. rail (rear)	5	13
Trans. rail (front)	5	..
Trans. brake carrier	1	13
TRANSMISSION COVER		
Change gear hand lever	2	5¼
Shift lever shaft	1	10
Emer. brake hand lever	2	15
Change gear lever stud	..	3½
Shift lever shaft sleeve	..	4
Emer. brake quad. rack	..	4½
Change gear lever quad	..	1
Trans. cover cap (lower)	..	8¾
Trans. cover cap (upper)	..	5
Inside change gear lever	..	11½
Transmission cover	5	1
DRIVE SHAFT		
Universal joint (rear)	4	4
Universal joint (front)	4	4
Drive shaft pins	..	6½
Univ. joint sleeve	3	5¾
Driveshaft pin bush	..	5½
REAR AXLE		
Diff. bear. support cap	..	14
Rear hub. bear. retainer	1	7½
Rear axle gear case	14	7½
Emer. brake bands	4	½
Pinion shaft bear. case	2	5½
Brake band spring	..	5¼
Bevel driv. pin. shaft	3	2
Rear axle gear case cover	2	10
Pin. bear. case cap	..	14¾
Rear axle truss rod (left)	..	11
Rear axle truss rod (right)	1	5¾
Pin. case packing nut	..	3
Rear spring support	4	8
Spring pivot bolt	..	2
Rear axle shaft	12	3
FRONT AXLE		
Knuckle pin	..	11
Steering knuckle (right)	7	1
Steering knuckle (left)	10	7
Knuckle con. rod lug	..	10¾
Front spring chair	3	4
Front axle yoke	3	6
Front spring fastener plate	..	4
Front wheel bearings (4)	4	..
Front axle tube	15	..



The wood frame of the Franklin with angle steel supports attached to support the engine and gearset. Observe that there is only one real cross member, this being at the rear end

would be practically nothing were it not for the present high price of aluminum.

Crankshaft Is Heaviest

In the lists of parts chosen more or less at random and arranged in groups in the center columns of pages 640 and 641 will be found parts of every sort of material. The complete assembly weights are hardly so instructive as those of the petty portions because it is only by study of the detail that the assemblies have been kept so light. In the engine it is noteworthy that the crankshaft, wherein weight has *not* been saved, weighs 44 lb. and the six cylinders total 132 lb., exactly three times as much. Here, of course, is a chance for more saving still, as the use of aluminum, which is not impossible with air cooling, would at least halve the cylinder mass. One of the most amazingly light parts is the flywheel disk—6 lb.—but this is merely the back plate and the weight of the wheel when the fan parts have been joined to it is not exceptionally low.

In making power plant comparisons, remember that the total of 637 lb. for the complete engine includes all the cooling system and that the equivalent of the water weighs nothing, so the weight compares with that of a watercooled motor plus radiator plus water. That the valve gear in total is heavier than the valves and operation of an L-head motor is probable but the overhead construction is a great aid to the success of the air cooling.

Riveting a Feature

Throughout the whole chassis it may be noticed in the illustrations that a very free use is made of rivets for effecting permanent junction between parts. Also it may be observed that a very large number of small individual pieces is used so that each piece is quite small and light until it reaches the assembly stage. Naturally, the main object of this form of design is to suit the requirements of the production end of the business, for the Franklin factory system is one of the most elaborate and yet simple of its kind. Facsimile production is assisted by the use of small unit parts rather than heavy pieces, but lightness plays a very large part in swaying the engineering department toward their use.

As an example take the drawing of the clutch which shows the light, stamped steel outer case or shell with the keys that secure the disks attached by rivets. To machine them solid would call for both a heavier stamping or a casting and would add considerably to the cost. Then again in the gearset the gears themselves are separate pieces and are riveted to the countershaft but there are no flanges, merely a slightly raised collar on the shaft to correspond to the position of each gear. The rivets pass through holes drilled half in the collar and half in the gear providing a perfectly secure attachment and a series of driving keys simultaneously. This method eliminates the flange, gives a cheap and simple countershaft and the simplest possible form of gear blank. Further the gear blank being of equal section throughout is stated to be less susceptible to warping in the hardening process.

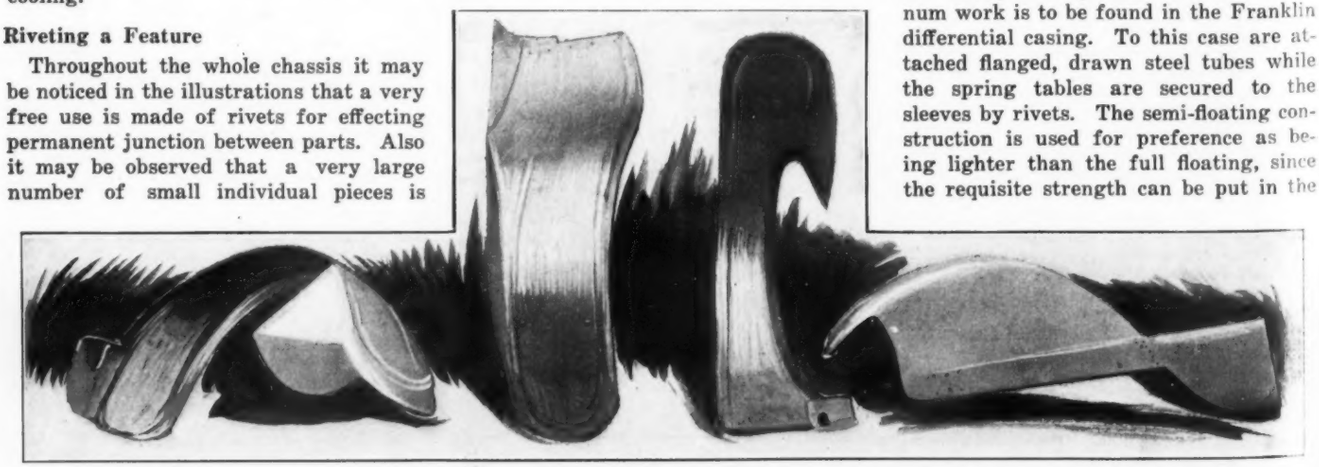
Another lightness feature shown in the gearset section drawing is the service brake, a band lined with Raybestos on a light, wide drum. This brake replaces the usual pair of external brakes on the rear axle with their brackets, bands, pull-off springs, etc. Being of smaller diameter and requiring much shorter linkage to the pedal it cannot weigh as much as half the ordinary service brake. Of course there are some who object to a driveshaft brake, but this is outside the present subject.

It will be granted by any engineer that a good transmission brake is satisfactory if properly designed and the Franklin construction shows how much weight it can save. Incidentally the brake is lighter than the majority of shaft brake designs in general use.

In the same drawing as that of the gearset is the steering gear which is also very light, and it is particularly interesting to learn that the Franklin Co. uses malleable iron for the case because, with the riveting system of assembly the lightest job is obtained with a fairly hard and strong material. Aluminum has been tried for this gear inclosure, but when the construction is modified to suit it the final result is not lighter than that in use. It may be observed that there is no waste metal in the gear, the malleable iron casing conforming closely to the configuration of the worm gear inside.

Rear Axle Complete 253 Lb.

The Franklin Co. was among the first users of die-castings and one of the neatest examples of permanent mold aluminum work is to be found in the Franklin differential casing. To this case are attached flanged, drawn steel tubes while the spring tables are secured to the sleeves by rivets. The semi-floating construction is used for preference as being lighter than the full floating, since the requisite strength can be put in the



A set of aluminum fenders for the series 8 Franklin. These are the same as the steel mudguards used on the series 7 but weigh 38 lb. less. Strength is obtained by beading and the fenders are quite as rigid as steel

driveshafts with a smaller expenditure of metal than would be necessary if the weight of the car was to be borne by the axle tubes. Bearings are reduced in number and therefore in weight correspondingly.

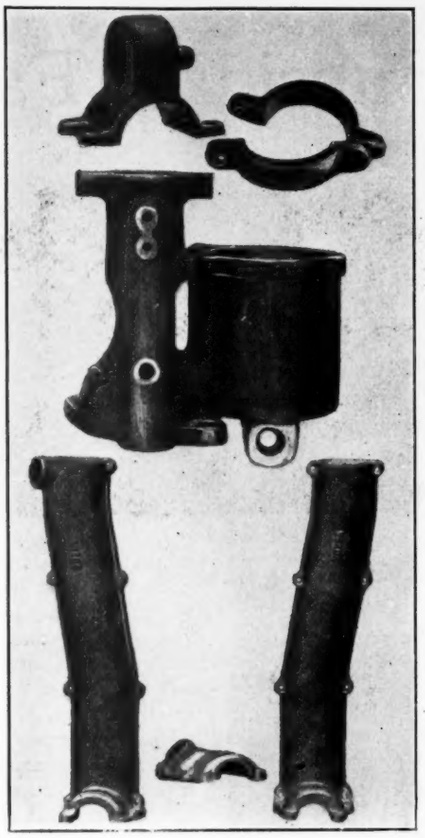
In making the cylinder castings the vertical cooling fins are set in the sand and so secured by the act of casting, this making a lighter and more efficient construction than is obtainable with cast-iron fins.

It may be observed from the table that the gearset is remarkably light, as from the drawing, that the same quality characterizes the clutch, and it may here be explained that the Franklin practice of using a separate gearset is dictated only partly by the difficulty of combining the motor to make a unit power plant. Of course, where the flywheel is used as a powerful cooling fan it is not so simple to make a unit job, but it would not be impossible to do so.

It is considered, however, that keeping the two assemblies separate allows weight to be saved in both gearcase and crankcase, while the frame attachment of the gearset does not weigh as much as the arms which otherwise would be needed to secure it to the crankcase with an adequate degree of rigidity.

Reasons for Wood Frame

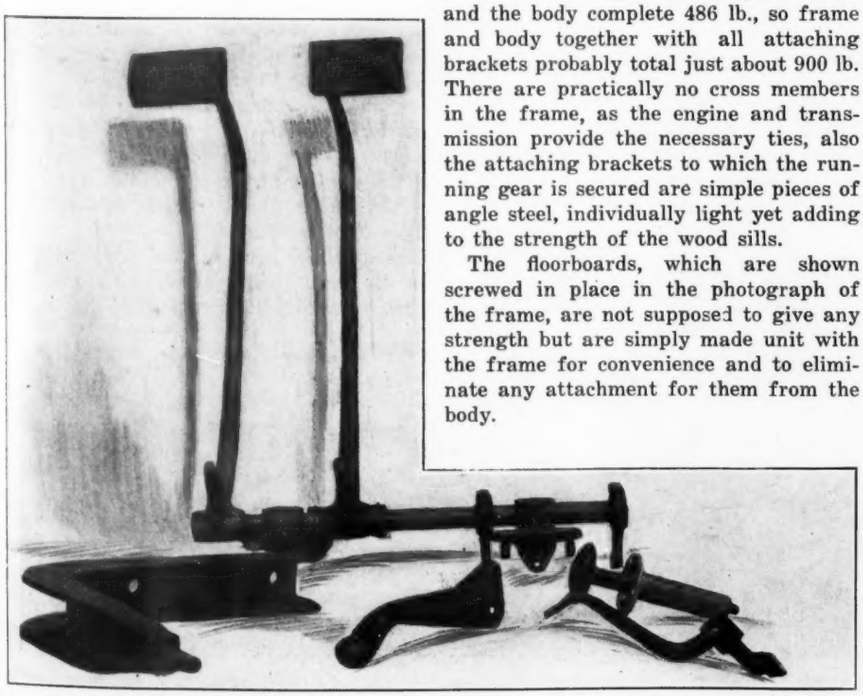
Coming to the main peculiarities of the Franklin, apart from the engine, there are the wood frame and the full elliptic springs. The latter are solely a question of designer's preference; they are used because the engineering faculty of the Franklin company thinks them the best form, and weight has little to do with the matter.



Aluminum carbureter body and hot air pipe and malleable iron muffler cut out

The frame is not quite the same proposition, however, as the system of assembly depends upon it, and it adds a good deal to the rigidity of the body. The sill with running board weighs 176 lb. and the body complete 486 lb., so frame and body together with all attaching brackets probably total just about 900 lb. There are practically no cross members in the frame, as the engine and transmission provide the necessary ties, also the attaching brackets to which the running gear is secured are simple pieces of angle steel, individually light yet adding to the strength of the wood sills.

The floorboards, which are shown screwed in place in the photograph of the frame, are not supposed to give any strength but are simply made unit with the frame for convenience and to eliminate any attachment for them from the body.



The light pedal assembly and examples of carefully designed small parts

It is claimed that the wood frame is much stronger and less liable to injury by accident than any steel frame, but it seems possible that the weight could be reduced in a different type of chassis by the Brush system of specially disposed sheet steel. Thus we may write down the wood frame as a peculiarity of design obtained without sacrifice of lightness.

Careful Detail Work

Where much weight is put in an ordinary chassis needlessly is in the petty parts. Just a few of these are shown in the photographic illustrations, and of these the most striking is the pedal assembly. Using good steel for the forgings a very small shaft can be employed, and there is no lack of strength or rigidity in the pedal arms. The foot plates are of the ordinary width which enables the dimensions of the other parts to be judged by eye.

In the same photograph are included three small brackets for various purposes, these being iron. Their feature is the use of webs to give strength, care being taken that the webs are in the proper places. The little bracket in the center would often be a mass of steel two or three times as heavy and yet no stronger or better.

In the top photograph are examples of aluminum work in the carbureter and the hot air pipe; the latter being a sand casting weighing only 15 oz. At the top is a malleable iron exhaust cut out, and this is practically as small as it could be with no waste metal whatever in it.

Think About Detail

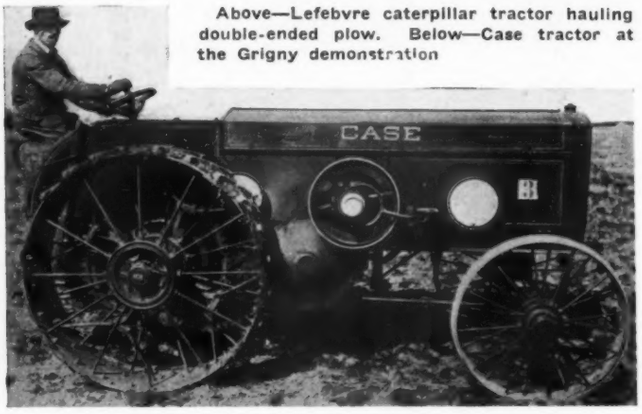
The Franklin car is in many respects peculiar, its mechanical features are largely unique and engineers may disagree as to the merits of some of them, but the points illustrated in the foregoing almost all of them apply to any sort of chassis. Eliminate the motor and the full elliptic springs and there remains just as much originality of thought in the more ordinary portions remaining.

Some of the parts look absurdly light; many engineers might without shame be afraid to use such light constructions, yet the Franklin has a reputation unimpaired by any doubts on the score of durability. To those, therefore, who are looking for ways to reduce the weight of a chassis the Franklin details of design provide probably the most instructive study that is readily available to-day.

A year or two more will show to what extent the same principles will come to be applied generally, and there are many who think that once the engineering thought of the industry is concentrated upon the making of truly light automobiles, the results will exceed the wildest speculations. In the race for "ability" it is likely that weight will prove more important than cylinders.

France To Subsidize Farm Tractors

Maximum Is One-Third Purchase Price Except In War Districts Where It May Be One-Half



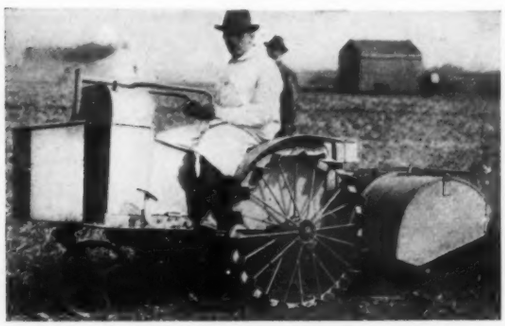
Above—Lefebvre caterpillar tractor hauling double-ended plow. Below—Case tractor at the Grigny demonstration

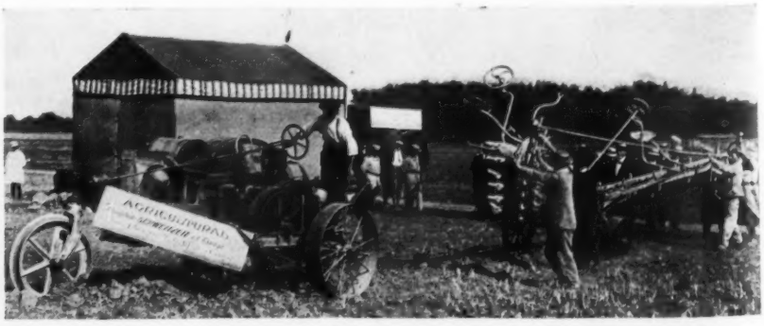
PARIS, Sept. 15—Subsidies are now granted by the agricultural department of the French government to farmers, groups of farmers, and municipalities for the purchase of motor plows, motor tractors and motor-driven agricultural machinery. Applications for the subsidy must be made through the district Prefect and must be accompanied by a description of the motor it is intended to purchase, cost price, conditions of payment, and a technical report on the nature of the land and the conditions under which the motor will be used. The scale of subsidies fixes the maximum at one-third the purchase price, except in the case of districts which have suffered by the war, when the amount may be increased to one-half. The subsidy will be paid immediately proof has been given that the motor has been delivered and that the purchaser has paid his share of the cost. Each year the government district agricultural inspector will deliver a report to the Minister of Agriculture on the results obtained by the use of these subventioned motors in his district.

This subsidy scheme, which goes into force immediately, will undoubtedly bring about an immense increase in tractors. The entire scheme is remarkably simple. It provides for the grants to established groups of farmers comprising not less than seven members, co-operative societies, syndicates of small farmers. The grants can be made to the communes or townships during the war only.

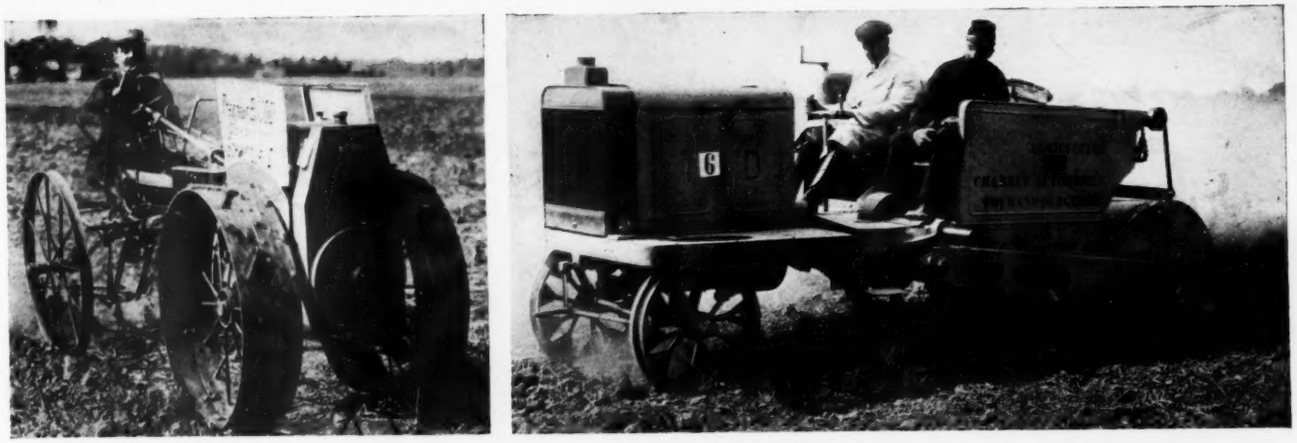
The announcement of this subsidy scheme gave additional interest to the motor tractor demonstrations held this week at Grigny, about 20 miles to the south of Paris. The demonstrations were privately organized, but received the presence of the Minister of Agriculture, and the management were given the use of some reserve troops for the necessary work in connection with the motor farming. American, French and Italian machines were presented and shown at work. The American-made machines were the two Bull tractors; the Aultman & Taylor gas tractor; the Case tractor, and the Bijou machine. Italy showed but one machine, the Moto Aratrice, a three-wheeler having a twin vertical motor and a single driving wheel. Among the French machines were two with rotary plows; the Motoculture, a very small machine with a compact modern type four-cylinder motor driving the road wheels through a two-speed gearset and the rotary picks by shaft and bevel gears, and the Tourand-Derguesse. This latter machine is a very modern construction with the latest type of four-cylinder block motor type, magneto ignition, forced feed lubrication, inclosed working parts, and drive to the road wheels and to the plow by means of chains. Another French machine was the Lefebvre caterpillar, which has been in service in France for a number of years.

While all the machines have long got past the experimental stage, the smaller units attracted greater attention, and much importance was attached to ability to turn readily in small



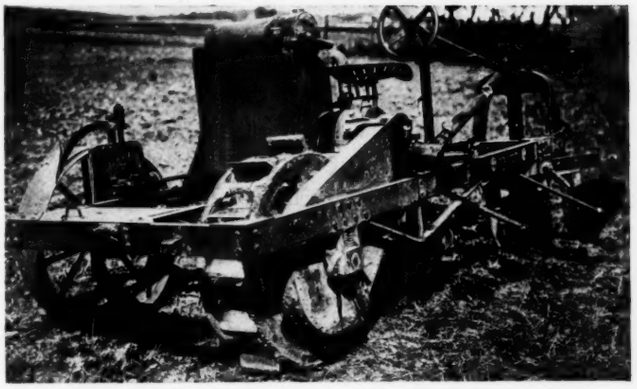


Left—La Motoculture machine with driver astride four-cycle motor. Right—Bull tractor in Grigny demonstration



Left—Bijou twin-cylinder tractor, like the Case and Bull, an American product. Right—Tourand-Derguesse with rotary plow

fields. Heavy tractors of 60 to 100 hp. were almost automatically ruled out under French farming conditions, by reason of their great size and time lost in turning them at ends of the fields. Agicultural conditions vary considerably in France, but as a rule it is the small and medium size tractor which attracts attention. Another point to which American manufacturers must devote attention if they wish to enter this market is fuel economy. With gasoline selling at 52 to 55 cents a gallon leakages cannot be afforded. The French government having decided to monopolize denaturized alcohol and encourage its use for internal combustion motors, it is certain that this fuel will be almost exclusively employed under the new scheme for farm tractors. Thus foreign manufacturers will have to be prepared to supply motors and carbureters specially designed to run on denaturized alcohol—this fuel will doubtless be 50 per cent alcohol, 50 per cent benzol.



Moto Aratrice twin-cylinder single wheel drive tractor

American Truck Survives Shell Fire

AFTER six months' active service, the first of the Pierce-Arrow 5-tonners has fallen to German shells. This truck, together with a number of others, was delivered in England minus a body. It was substantially armor plated at an automobile and armament factory in the Midlands and fitted with a special quick-fire gun for anti-aircraft work.

Under modern methods of warfare even a 5-ton truck with an armor-plated body is an inconspicuous object on the landscape. To-day its sides may represent a brick wall; to-morrow they will have changed to a stone wall; during the next night they have been metamorphosed into a hay-rick; another coat of paint and they have become a common wayside hedge.

On the particular occasion under review the first shot was 100 yd. short, but this was sufficiently near for the crew to dive into a convenient dug-out where, with 4 ft. of earth and stout beams above them, they watched through a loop hole. The second 6-in. shell was 50 yd. over. The third hit the car on the left-hand side, carrying away all the lower supports of the armor, loosening up every rivet and shearing off a large number of them. The explosion occurred inside the body and carried away the doors and window flaps and burst the gasoline tank. A fraction of a second later the entire car burst into flames, for the 12 gal. of gasoline had flowed over the whole floor.

It was at this moment that the fun began, for there were 300 rounds of ammunition for the gun and 1000 rounds for the rifles and small arms aboard that car. From the safety of their dug-out the crew watched the firework display.

That night another Pierce truck crept up to the armored car and a delicate towing job was undertaken. The right rear wheel had five spokes burned out and had lost all the rubber with the exception of the strip in contact with the ground when the firework display started. The steering wheel had disappeared, but a lever clamped to the column served to guide the truck.

An examination showed that there was no necessity for this. It was almost impossible to move about within the body owing to the mass of twisted and shell-nicked pieces of metal. But the motor was in good condition. The water-jackets were intact; the radiator had lost no water; most of the lubrication pipes had their joints unsoldered; all ignition wires had gone; the rear wheels were useless and an entire set of tires had to be obtained. In three days that chassis was in running order.

Armored Pierce truck, disguised as brick wall, hit by shell

Shipping 2000 Cars a Day

System in Shipping Department Enables Ford to Ship 333 Freight Carloads of Automobiles Daily—204 Loading Platforms Assist in Preventing Accumulation of Cars

By Marc Braun

THREE hundred and thirty-three freight carloads of automobiles have been shipped daily by the Ford Motor Co., Detroit, Mich. This is more than six trainloads of fifty railroad cars per train, and is based upon a manufacturing schedule of 2000 Ford cars per day.

The story of how the Ford company has systematized its manufacturing methods, to enable it to build 2000 automobiles or more a day, has been told. It has been found highly interesting. Little, however, has been made known as to how the company manages to ship such an enormous daily output.

System Makes It Possible

Because if it seems extraordinary, even in these days of wonderful progress and achievements in the automobile industry, for one manufacturer to build in a single day as many cars as was the total annual production of many a leading automobile maker only a few years ago, it is almost as astonishing that it is possible to ship 2000 or more automobiles, not only once or twice after special railroad and other arrangements had been made, but regularly, day after day, and without special previous arrangements.

System made this possible.

Preventing Accumulation of Cars

Just as it required systematizing the work in every department connected with the construction end of the business, so it was necessary to find ways and means and new methods to enable the daily production to be entirely shipped daily. The policy of the company is to get rid of the day's output in order to avoid accumulation of finished cars, as this would disorganize the working system.

300 People in Shipping Work

To take care of this shipping 300 men and women are employed exclusively in the Detroit traffic and shipping departments, attending only to matters having to do with outgoing and incoming freight cars and materials.

The Body Chute

The actual shipping work begins at the body chute which is located in the shipping yard and connects with the body stockroom. Under this chute the tester drives the chassis to a designated point where, as soon as the chassis arrives it receives its body. This comes down the chute, and, almost automatically, finds its way into a temporary position on the chassis. The car is then driven to the finished car assembling platforms, where it is taken in hand by crews of freight handlers, who take off the body, wheels, fenders, guards, etc., before loading into the freight car.

Domestic Shipments Disassembled

Cars for domestic trade are nearly all shipped partly disassembled. This means that the chassis is loaded vertically in one end of the freight car and the body in the other end. The wheels, guards and fenders go separately. In this manner six automobiles are loaded into a 36-ft. freight car, or eight into a 40-ft. car, the latter being used for shipments west of Chicago.

About 95 per cent of all the cars are shipped that way,

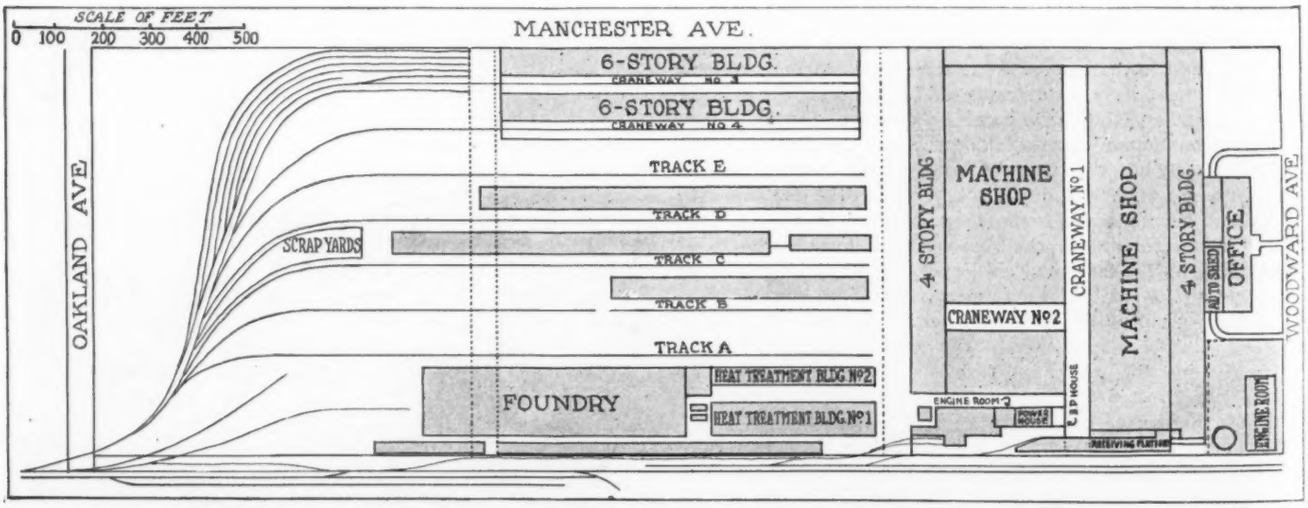
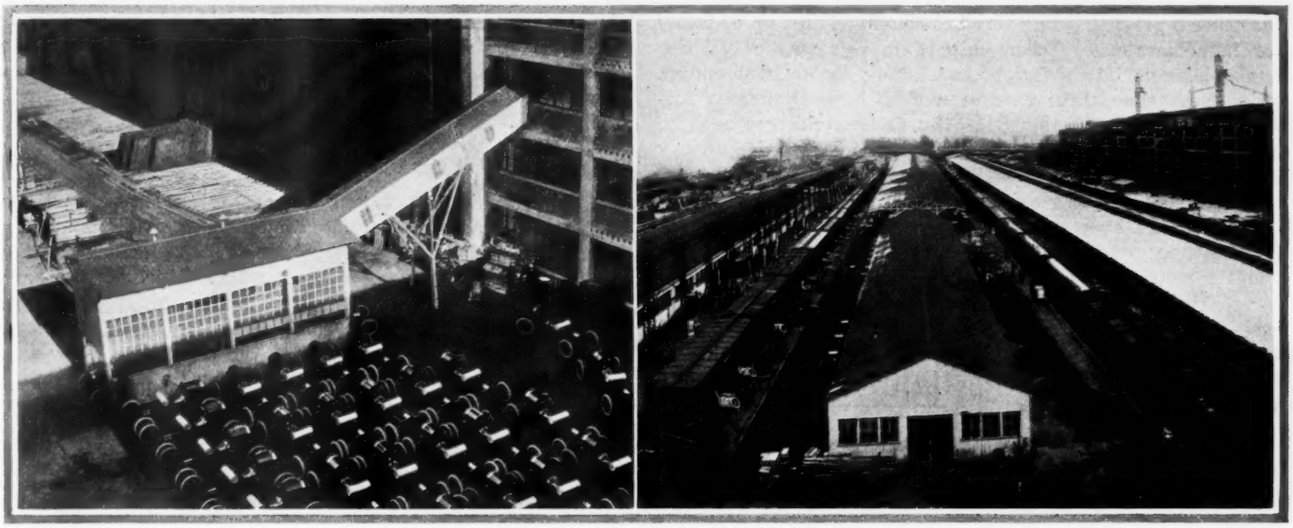
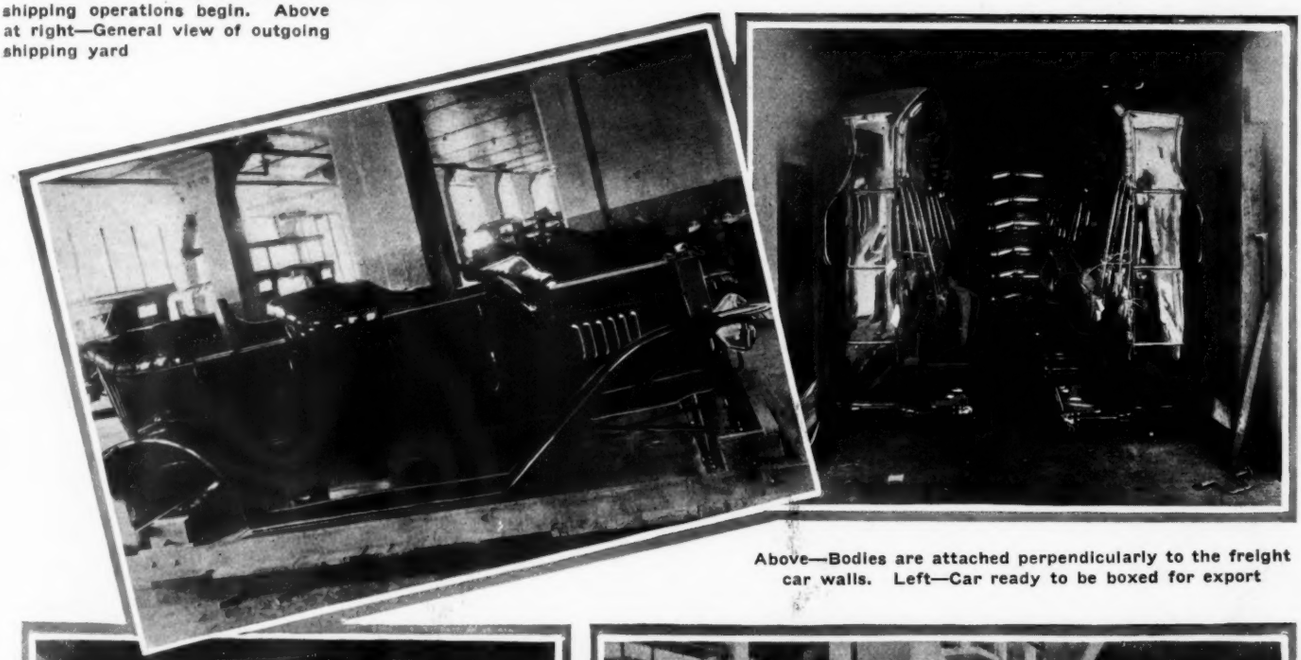


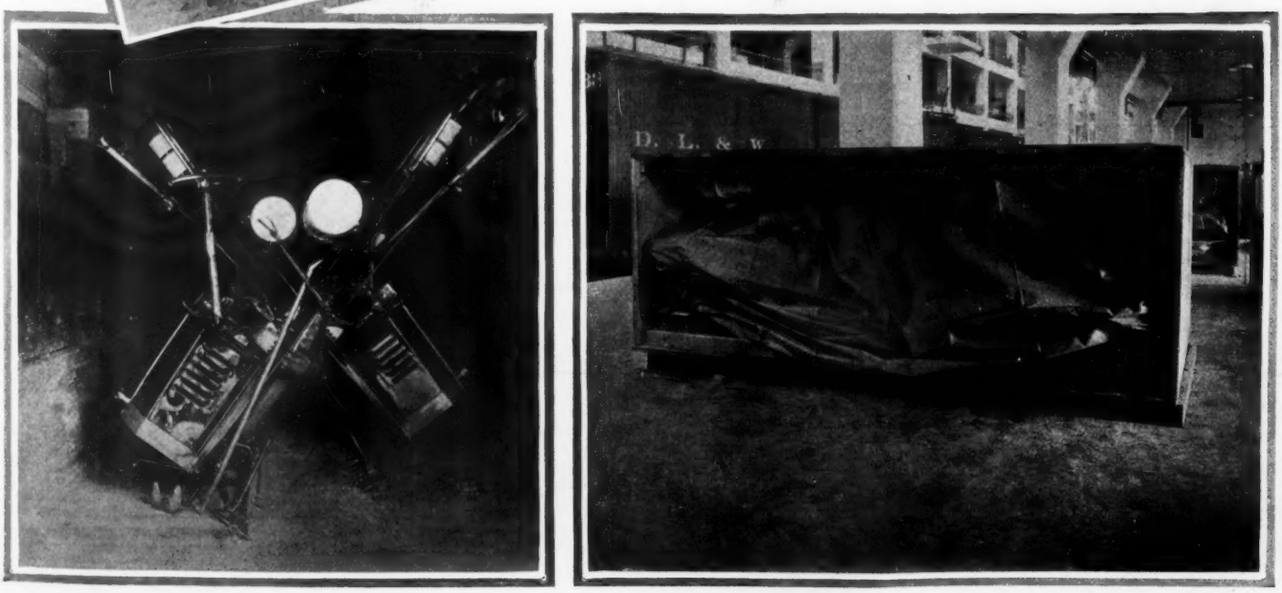
Diagram showing layout of the Ford Motor Co. shipping department. Two of the seven tracks entering the Ford yards are in the six-story building while the others are indicated at A, B, C, D and E, these having loading platforms on each side with covered wooden buildings or sheds to protect from rain goods stacked there for shipment. There are 204 loading platforms facing the two railroad tracks which enter the six-story building and two traveling cranes lift specially constructed carriers of incoming materials upon these platforms or lower to the ground loading floor goods which are to be shipped



Above at left—Body chute where shipping operations begin. Above at right—General view of outgoing shipping yard



Above—Bodies are attached perpendicularly to the freight car walls. Left—Car ready to be boxed for export



Left—Chassis are loaded into the freight car diagonally. Right—Car wrapped up and ready for boxing

the other 5 per cent going forward completely set up or ready for immediate use. When shipped in this way only three automobiles go into a freight car. Only dealers who cannot order more than three cars at a time have shipments forwarded that way inasmuch as the freight charges are the same as if six cars are sent. The railroad rates are always per 10,000 lb., and the actual total weight of six Ford cars will not exceed that figure.

The loading operation consists in placing and attaching the bodies in two rows of three in one-half of the freight car, and the chassis, also in two rows, in the other half of the car. While these are placed in a diagonal and alternate position, the bodies are placed perpendicularly. Fenders and mud-guards are fastened together in lots of six, and then attached against the sides of the freight car. The wheels are fastened all along the walls.

Inspection and Checking

After a car is loaded a loading inspector comes to see if everything to go into that freight car has been placed in it. After he is through, the shipping clerk is called for the final checking. Then the car is turned over to the sealer who locks and seals it and attaches upon the door an instruction tag for the railroad.

This tag reads as follows:

Important—Rush Car No. .....
This Car Loaded by
Ford Motor Company
Highland Park Plant.
Switch to.....R. R.
Date.....

For loading and unloading work 130 men are now employed exclusively on the shipping platforms. They start at 6.30 in the morning and go home at 3.30 in the afternoon, having half an hour at noon. They work in shifts or crews of five or six men and load 100 cars into the freight cars in 1 hr. It requires an average of 20 min. to load six Fords into a freight car.

Cars for Foreign Countries

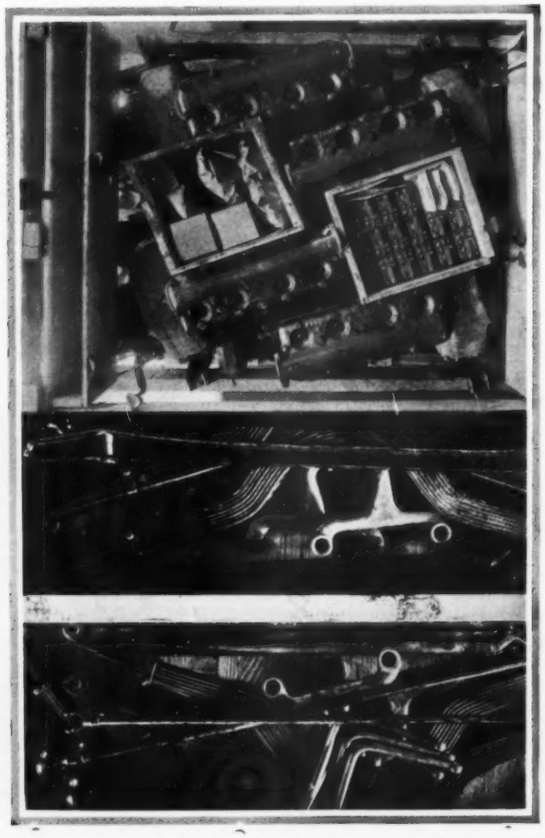
Cars for shipment to foreign countries, excepting those for the Ford assembling plant in Manchester, England, are knocked down and completely boxed. This means that the wheels, springs, guards, fenders, windshield and top are taken off, leaving the chassis with the motor and body on. In this way the car takes up much less room, which means a big saving in freight charges. At the same time, only such parts and accessories are taken off as will not require the service of a specialist to again put on.

For the Manchester Plant

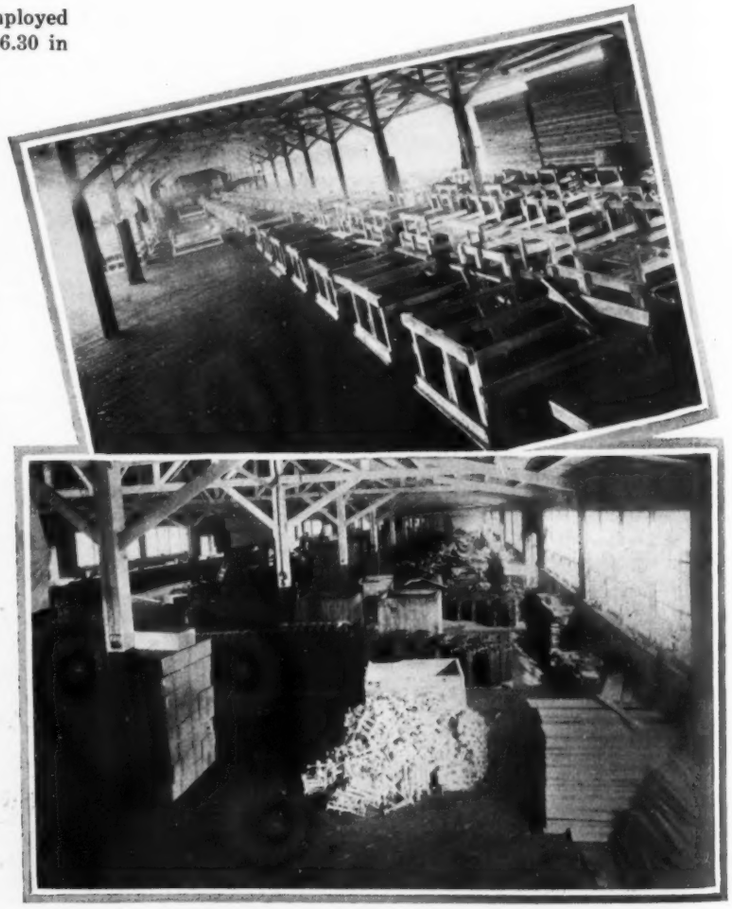
Shipments of cars for Manchester go forward entirely disassembled. The motors are shipped four in a box, together with all the motor's parts or attachments. Frames and bodies go forward in lots as motor car parts.

For some time an average of twenty-five cars have been shipped daily to foreign countries. This does not include what is being sent to Manchester.

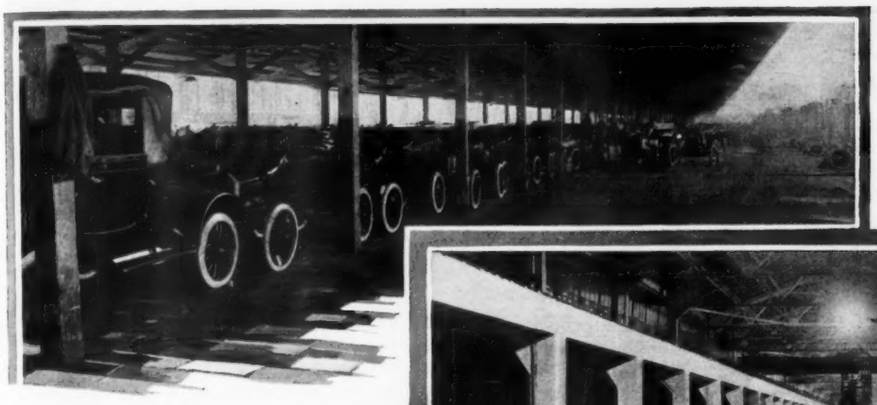
Seven tracks of the Detroit Terminal Railroad are in the yards of the Ford plant, and they connect with all the Detroit freight stations. Five engines are in constant use exclusively for the company, three during the day and two at night,



Above—Top view of a shipment of motors to the Manchester, England, assembling plant of the Ford company
Below—Bottom of the box in which motors are shipped to the Manchester assembling plant. All space is utilized



Above—Part of department for shipping to Manchester, showing crates in which four motors and their parts are packed
Below—Another section of the department for shipping to Manchester. Here parts, some of which are shown, are packed



Left—Shed platform where cars for export only are brought to be loaded

Below—A view in the six-story shipping building, showing some of the 204 loading platforms

to haul outgoing and incoming freight cars.

190 Carloads Go Out Daily

The daily outgoing traffic averages 190 carloads, and the inbound freight averages seventy-five carloads a day.

The loading capacity of each of the seven tracks is 1000 ft., and they hold twenty-four ordinary 36-ft. freight cars.

The tracks for incoming freight are located in the huge shipping and stockroom building. The entire ground floor of this six-story structure, which is 850 ft. long and 200 ft. wide, is used as a receiving department for incoming materials, while the other five stories hold the radiator, top and body, curtain and upholstering, painting and trimming, windshield, finished and miscellaneous stockrooms.

This building has on each floor facing the two railroad tracks seventeen loading platforms on each side, or, all told, 204. Through the entire length of the building two craneways, each having two traveling cranes, are in constant operation. They are used to lift upon the platforms in specially constructed carriers the incoming materials or to let down to the ground loading floor goods which are to be shipped.

In the yard outside of the main shipping building are the other five tracks, on each side of which are loading platforms having either a wooden building completely covered or simply a shed under which goods for shipment are stacked and thus protected from rain.

General Traffic Department

The general traffic department's personnel consists of a general traffic manager and three assistant managers, one on claims, tarriffs and classifications; one in charge of the loading and checking of outbound carload shipments, and one in charge of all inbound shipments. There are also a chief clerk, the rate clerks, billing clerks, car checkers, stenographers, yard master and clerks, all told twenty-five employees in addition to the 130 loaders on the dock.

Less-Than-Carload Shipments

There is a second shipping department for less-than-carload shipments at the head of which is a chief shipping clerk. He has 123 assistants, such as office clerks, packers and checkers.

Parts and Accessories Separate

Besides shipping 2000 cars a day to dealers and distributors, large quantities of parts and accessories are shipped daily to some of the Ford assembling plants throughout the country. The loading of these parts is done generally on the tracks in the shipping building, thus not interfering with the loading of complete cars.

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Canadian Exports to U. S. $97,013

The total automobile export trade by Canada with the United States to March 31, 1915, which closed the fiscal year, amounted to $97,013 as compared with $138,978 in 1914. Automobile parts amounted to $35,558 in 1915 as compared with $36,341 in 1914.

Canada shipped fewer cars to Great Britain in 1915 than to the United States, the total value of these amounting to $76,050 against $320,407 in 1914. Automobile parts, however, amounted to $130,001, considerably larger than the United States figures. The parts shipment in 1914 to Great Britain amounted to only $1,895.

Shipments to other countries in 1915 amounted to $2,472,761 as compared with $3,112,477 in 1914. Automobile parts in 1915 to other countries amounted to $243,070, a considerable gain over 1914, which amounted to $197,621.

Imports from the United States, Great Britain and other countries were considerably larger than the exports to these countries. Automobiles and trucks to the value of $4,591,182 were sent from the United States to Canada in 1915, a drop of nearly $2,000,000 from the 1914 figures which were $6,528,086. As a matter of fact, imports from Great Britain and other countries in 1915 also showed large drops from the 1914 figures. Great Britain shipped cars and trucks in 1915 to the value of only $252,898 as compared with $621,979 in 1914.

Automobile parts imports to Canada were also lower. The United States imports, though lower, led in value, the 1915 imports being $2,142,895 as compared with $3,926,077. Great Britain showed a proportionate drop, its 1915 figures being $22,337 as compared with $31,981. Imports from other countries amounted to only $961 compared with $8,321 in 1914.

The Engineers' Forum

Early Days of Aluminum Pistons

By Joseph Leopold,
Engineer, Walker M. Levett Co.

NEW YORK CITY—Editor THE AUTOMOBILE:—In view of the interesting discussion which has appeared in your journal of late, relative to the utility of aluminum and its alloys for efficient automobile construction, it is perhaps, opportune at this time to offer some brief historical data and instances of extremes beginning from the time when aluminum alloy made its début in this progressive field, and leading up to the present day; the elapsed period being, needless to say, comparatively short.

I consider it recognizable that my company is the pioneer foundry making a specialty of aluminum alloy for piston purposes, and, assuming this to be authentic, it quite naturally follows that it has been most intimately associated with the expanding wave of popularity accorded these metals and while refraining from the extreme, observation based on practical experience has created the conviction that Magnalite pistons have become a fixture and will be of still greater importance in the future development of the high-speed motor.

Aluminum Cylinder Preceded Piston

Prior to the time when the automobile manufacturer became cognizant of the fact that weight in reciprocating parts must be materially diminished if high speed was to be obtainable, we were invited to experiment in casting cylinders for an extremely high speed, intensely efficient type of aeroplane engine. Cost was to be a secondary consideration—reduction in weight imperative. Subsequently, after repeated efforts and diligent experiments, we succeeded in producing an aluminum alloy cylinder which fortunately met every requirement. Our customer completed, in his experimental department, the most rigid of tests before mounting the motor, and from all information in our possession the same motor is giving satisfactory and efficient service to this day, the cylinder walls showing a remarkably low percentage of wear.

The proposition of using aluminum alloy pistons apparently had not occurred to anyone up to that time. It dawned upon this manufacturer that if this alloy would answer for cylinders it should also answer for pistons and we naturally then made them the object of experiment. The cast-iron pistons used at that time weighed slightly in excess of 6 lb. each. We made up a set of pistons which weighed about 2 lb. each from an alloy somewhat analogous to Magnalite. It might be said at this point that all concerned in the experiment were more or less dubious as to the ultimate results and consequently "the bench engineers" of our foundry, as well as those of the motor plant, expressed an assortment of theories about as numerous as the number of persons employed, but the pistons accomplished even more than we anticipated.

It was, perhaps, chiefly fortune that the clearance and remaining factors of importance were approximately correct, for if failure had resulted at this instant, it is extremely probable we should have passed up the matter of aluminum alloy pistons as impracticable. From this point the development of Magnalite pistons was evolutionary.

From all data obtainable, Fred S. Duesenberg, manufacturer of the motor bearing his name, was one of the first engineers to attempt a practical succession of experiments with the aim of determining constant factors in Magnalite piston installation. It was easy to realize the benefits that would surely accrue if these pistons could be made to respond to every requirement. The exceptionally light weight and quick thermal conductivity were obvious as elements of great magnitude, particularly where high speed or light weight were consequential considerations.

As Mr. Duesenberg was specializing in high acceleration motors for both racing and aeroplane usages, it was manifest that the merits of Magnalite pistons at that period should readily appeal to him and so aluminum alloy pistons were introduced to automobile racing. Their utility and adaptability soon won the hearty indorsement of the entire racing fraternity, and it was not long after this that automobile manufacturers conjectured it might be practicable to increase the value of their standard productions by the use of Magnalite pistons with the result that Magnalite is now a familiar product to a major part of your readers.

It might be of interest to note here that out of thirty-six cars equipped with these pistons participating in twenty-four of the largest races in 1915, sixteen have taken first place, sixteen second place and four third place. In one instance—the 100-mile Chicago Challenger Race—the remarkable work performed by the Stutz car equipped with Magnalite pistons is most worthy of especial consideration since it was the initial American car to sustain a track record of over 100 m.p.h. in competition. James Pugh's Disturber IV, equipped with Magnalite pistons was the first motor boat to maintain an average speed of more than 60 m.p.h., a truly remarkable performance.

German Alloy a Basis

The origin of alloys is usually a matter of speculation and Magnalite is no exception to the rule. In Germany for a number of years a metal was produced called Magnalium which possessed many Magnalite qualities. The high cost of aluminum at that time limited its general use and production, consequently, while the metal offered valuable properties for a variety of purposes, the price was then prohibitive for general commercial adaptation. As the methods for producing aluminum were simplified the price of the metal decreased; therefore a diversified use of it was possible on a huge scale. Our experimental department then undertook to produce a metal which would combine all of the desirable qualities of this German product and simultaneously eliminate certain features which were undesirable for automobile piston requirements. These endeavors resulted in Magnalite, which is a specially adapted Magnalium form of metal for piston construction.

Since the use of alloy pistons has become universal, the rules governing their machining and installation are becoming more generally known, with the result that where

such deterrent influences as seizing, piston slap, or scored pistons might have been prevalent in experimental stages, they are now simple details which may be avoided.

The extremes to which Magnalite pistons have been subjected up to the present time with successful results, include a design of 12⅞ in. bore for a heavy duty engine contrasted with a ⅞-in. piston for a working model of an air-cooled aeroplane engine. Limits such as these called for specific consideration.

Some idea of the endurance of this metal may be had through racing experience at the recent Twin City meet. A broken valve worked itself into the cylinder while the car was running at a speed of approximately 90 m.p.h. The terrific hammering of the piston against the tungsten steel valve forced it through the top of the cylinder, but left the piston itself intact and except for a wide gash in the dome, it showed little indication of what had happened.

At the Chicago race, an oil feed in one of the motors became clogged in such a way that insufficient oil was circulated and after each lap or so it was necessary to stop the motor in order that it might cool off. During the time it was running, the heat generated was so great that the top of one of the pistons fused sufficiently to sink down between the arms of a system of special ribbing which was designed for racing purposes. As the motor remained intact the piston was not removed, and when the oil trouble was overcome the car went back into the race badly distanced, but still "in the running" with probably what was one of the most peculiar looking pistons ever finishing in an automobile race. A number of other racers had iron pistons give way on account of the excessive speed and heat. This customer feels that he need not worry any more about piston trouble.

In another car a set of pistons had been used for approximately 2500 miles of actual racing with an additional 1500 miles of practice work. During one race a connecting-rod broke near the wristpin boss with the result that the piston was jammed against the top of the cylinder forcing the latter about 2 in. above its normal position. Except for the fact that in forcibly pulling the piston out of the cylinder it was badly scored, there were no other signs of serious damage. This connecting-rod broke at a speed of well over 90 m.p.h.

Piston Wear Is Slight

A recent examination of a motor equipped with Magnalite pistons after running over 20,000 miles showed a maximum cylinder wear of 0.00125 in., while with iron pistons that had formerly been used in this motor, a wear of 0.011 in. in 18,000 miles was determined by caliper. Perhaps one of the most interesting evidences of the extreme possibilities of Magnalite pistons may be found in a carte-blanche order which we recently received from a firm now making one of the finest automobile racing and aeroplane engines. The letter accompanying the order for an experimental set of fourteen pistons for this concern stated that it had been their practice to machine their pistons from the solid steel billet. Light weight was mandatory, so it was left entirely to our judgment to produce if possible a piston that would stand up as well as one of steel and at the same time permit them a saving of approximately $160 per engine. One restriction was that the Magnalite pistons must be as light—lighter if possible—than the piston machined from steel.

Examination of the blueprint showed that 1 mm. thickness was allowed for finished steel construction in the skirt, offering some idea of the light weight construction employed. After giving the matter due thought, we finally produced a piston which weighed less than 11 oz. or about 1 oz. less than the steel piston. We permitted our skirt a thickness of 2 mm. in the alloy metal, and by the system of ribbing referred to above, we secured a rigidity and strength at the points of principal stress which we believed would meet every requirement. Furthermore we advised our customers on shipping the order that if they were willing to permit us to design another piston for them, with the understanding that the results were to be regarded as purely experimental, we were confident that a further saving in weight of at least 2 oz. could be made possible by slitting segments from parts of the skirt which do not carry any appreciable stress other than that of simply guiding the piston movement. We believe that the satisfactory results following the tryout of the first order, as evidenced in a subsequent large order for pistons of the same design, will warrant this company undertaking the experimental work with the lighter piston at an early date and are awaiting their decision with much interest.

Prefers Iron or Steel

By E. H. Sherbondy

Consulting Engineer, Clay & Sherbondy

BUFFALO, N. Y., Editor THE AUTOMOBILE:—In reference to the discussion which has appeared in recent issues of THE AUTOMOBILE, on the comparative merits of the use of aluminum motor pistons and cylinders:

The two fundamental considerations with regard to the use of aluminum for motor pistons and cylinders, are taken to be the maximum strength of the material in question, and the heat flow from the gases of combustion to the cooling water and crankcase air. The heat flow depends only on the heat capacity of the gases of combustion and the cooling water. The piston proper is heated by convection and radiation; this heat is carried off mainly by convection to the cylinder lubricating oil film and the rate of convection depends upon the maximum temperature within the cylinder and the piston speed. This heat is again carried by convection from the lubricating oil film to the cylinder wall, and in turn carried by conduction through the cylinder wall proper and finally by convection to the cooling water. It then results that the conductivity of the material employed for the piston is not of material consequence.

Inertia Forces Unimportant

The second consideration for the use of aluminum as a piston material is the necessity of reducing the inertia force values to a factor within reasonable limits. Consideration of the inertia forces of reciprocating mechanisms is very old in the field of kinematics, and has been treated of in almost all text books on mechanics. However, consideration of the inertia forces alone is only a partial treatment of this subject, the important factor being the resultant secured by combining the inertia diagram with the indicator diagram. At low motor speeds the inertia forces are always very small, though the indicator pressures may be very high. Under these conditions the maximum turning effort is developed during the first half of the piston stroke. At high rates of revolution quite a different state of affairs exists. The inertia forces gain very materially in value, in fact, as the square of the motor speed, and it then results that the maximum turning effort is developed during the last half of the piston stroke. I believe that automobile motors are ordinarily designed on the basis of an initial indicated pressure of about 350 lb. If this pressure is taken as the basis of construction, it is clear that the values of the inertia forces are of little matter until they exceed the indicator pressure. The speeds at which this occurs are beyond those reached by any excepting a few racing motors. Clearly, of course, we do not wish to have the inertia diagram cut the indicator diagram at two places during the expansion stroke, as this would result in a rapid reversal of pressure on the bearings, putting the connecting-rod in tension.

Automobile motors of current construction, which are ap-

plied to touring and commercial vehicles have such restricted valve capacity that it is impossible for them to reach rates of revolution high enough so that the inertia factor is a matter of very great importance. Until motors are constructed for current use which have speeds of from 4000 to 5000 r.p.m., we shall not be much concerned with the minor problem of inertia.

Piston Friction Large Factor

Professor Reidler has shown that the friction between the piston and cylinder walls amounts to more than 30 per cent of the total friction of the motor. Professor Tower on lubrication concludes as a result of his experiments that where an oil film exists between two metal bodies having relative motion, the friction is independent of the material of which they are composed. The coefficient of friction of aluminum on any other material is not a factor for consideration as long as lubrication persists. The mechanical efficiency of the motor can only be increased by reducing the friction of the machine elements and that due to the movement of the gases.

The writer has tried various aluminum alloy pistons in automobile, stationary and aeronautical motors, and in every case where a motor was operated at maximum power for long continued periods failure resulted. Cracked heads, cracked piston pin bosses, scoring, and in one six-cylinder, two-stroke motor of 5 in. bore, we melted the deflector heads off the pistons.

I cannot but agree with F. R. Porter that what we need in motors having a high output relative to the displacement, is materials which have a great maximum of strength, which is not enormously impaired at the temperatures occurring in internal combustion engines. After having tried aluminum, steel and cast iron for piston and cylinder construction, the writer concluded that for this service cast iron is far superior to any other material yet tried.

High Tensile Iron

By recent metallurgical experiments we have been able to increase the maximum strength of cast iron to between 60,000 and 70,000 lb. and, where it has been desirable, to give this material the same hardness which commercial chrome nickel steel has in its untreated state.

Again where the cost factor enters into the problem, as it always does, commercially, steel is out of the question, and we believe that cast iron is far the best compromise.

Empire Engineer Thinks Sixes Good for All Cars Up To 2600 Lbs.—No Excuse for Cheap Twelves

By Louis Schwitzer

Production Manager, Empire Automobile Co.

INDIANAPOLIS, IND.—Editor THE AUTOMOBILE:—The multi-cylinder engine has been the logical consequence of the necessity for reducing the cubic inch displacement of the individual cylinder to obtain maximum efficiency combined with smooth, quiet running and long durability.

The decrease of the bore brings with it light moving parts and reduction of the inertia stress, light bearing pressures and facilitation of the lubrication problem. The light power impulses of the individual cylinder reduces the vibration to the minimum so it cannot be noticed by the occupants of the car when accelerating the motor, giving the desired smoothness.

There is no question that the multi-cylinder engine, may it be the eight-cylinder, or twelve-cylinder, will not replace the four and six, each type of engine having its own field.

It is shown that the average American car has about 1 cu. in. piston displacement for each 10 lb. of its weight. Each maker simply will decide how many cylinders of an individual maximum displacement of 50 cu. in. per cylinder are necessary to propel his cars to give them the necessary ability. The different classes of cars group themselves in about the following groups: up to 2000 lb., 2500 lb. to 2600 lb., 3000 lb. and above.

It is obvious that the four-cylinder motor with 200 cu. in. displacement, this being the multiple of the "50 cu. in. maximum piston displacement per cylinder" will handle the 2000 lb. car very well, while the six-cylinder of the same individual cylinder displacement will take care of all cars as high as 2600 lb. Above that there is no doubt multi-cylinder engines will be employed.

The "50 cu. in. maximum piston displacement cylinder" will have its bore limited (in the writer's opinion) to about 3½ in. maximum diameter. These are the logical consequences as seen from the engineer's point of view, but there are other conditions which influence the individual maker of cars, especially of the low priced, light weight type.

The national advertising campaigns of a few big concerns create a demand for certain types of cars which he often must follow, even against his best judgment as to what is best for his product. The advertised features of the big manufacturer may be necessary improvements and features of his own product, but entirely superfluous and not desirable in the product of the smaller manufacturer, who is building a different type of car, but yet these National campaigns make the features advertised for the general public a "fashion hint" which tries to force the other makers.

This is particularly the case with the multi-cylinder motor. The public in general does not realize why the multi-cylinder motors have been built. They simply take them as a development which applies to all motor cars. The writer remembers when the first eight cylinder motor was announced in this country. All our dealers simply got scared to death, and worried because we did not want to decide to build an eight-cylinder car, and believed that they would be entirely out of the running with the four or six. Of course time has proven this to be different. It has been shown that the small car works with excellent satisfaction with the four- or six-cylinder motor with the proper individual cylinder displacement, and that the low-priced multi-cylinder car has disappeared from the market. This probably was partially because of the low cost that could be allowed for the construction of such a motor. It could not be built with the same degree of care, workmanship and material as could the four or six which was ample for this weight of car.

The announcement of the twelve-cylinder motor has caused a similar disturbance in the trade, and there are appearing already low-priced twin-six cars for the construction of which there is absolutely no necessity from the manufacturer's point of view, but which are being built for reasons as said before.

It is not only a matter of necessary piston displacement for the individual car, but also of economy. On cars of greater weight, above 3000 lb., which naturally are also higher priced cars, economy does not play as important a factor as it does on the low priced and light weight car, because a different class of the public buys it. This is another reason why the multi-cylinder engine, in the writer's opinion, will not not conquer the field of the low priced car, except in individual cases where it will be employed as a stimulant of sales, and not because it will perform better.

Luxurious Streamline Body Not Yet Built

Some Suggestions for Future Development

By Julian F. Brasor

NEARLY two years ago there appeared in this magazine a criticism of automobile bodies in general, written by the writer of this article, in which were pointed out the errors of the designs then in use, how they had remained practically unchanged since the back-door type of tonneau and that it seemed as though the manufacturers would never have time to consider the most important part of a car, its general appearance. Suggestions were made as to the improvement of the bodies, the principal one being the body with only two doors, it being argued that this was the only logical step toward a real improvement in the general appearance of the car. It was predicted that in 5 years this type of design would be common and would meet with great favor, and that not until then would the automobile have become an automobile, a complete change from the horse-drawn carriage.

The Two-Door Design

Within the last year no less than four great manufacturers have offered cars with the two-door idea. They are old and well established companies, so it must be taken that they have considered this idea a good one. The purpose of this article is to show that the real streamline car with a luxurious body is yet to be built, and that merely closing the fore doors and dividing the front seats is not arriving at this type of body. The accompanying illustration gives a clear idea how different it is from the present two-door cars, yet it is not radical in any way.

The chassis has a very long wheelbase in order to place all the weight of the car between the axles, without sacrificing any space in the body, and as it is hung low and the running boards are hung below the axles these features give the car a sturdy, well balanced and fast appearance, the whole secret of which is in the long horizontal sweeping lines of the body. Note the one piece oval fenders and how the rear ones are swept over the wheels, the cantilever spring suspension permitting the jacking up of the car if necessary, without getting besmeared with mud. Note the rounded radiator, that it is placed considerably back of the front axle and that the water cap is unusually large, and that the bonnet and cowl rise in a straight line to meet the windshield, which is built into the body and is really a part of it.

Comfort and Style

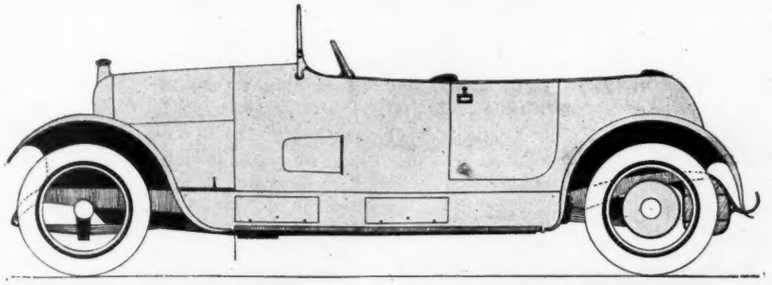
Most windshields look as though they were merely stuck on the bodies. The bonnet widens on all sides to meet the body in one smooth surface. The perfect union of the bonnet and body is the secret of the real streamline car. The body is unusually wide and is slightly wider at the top than at the bottom, this feature giving the five passengers plenty of room as well allowing the use of deep, heavy upholstering and thick cushions which rest flat on the floor of the body and are kept from sliding forward by concealed leather stays when not in use. Note that the upholstery is barely noticeable above the top of the body, yet this does not spoil the comfort of the seats since the body is high-sided without being top-heavy. Note how the rounded back pitches forward, placing the rear seat in front of the rear axle, a feature which makes for easy riding and also overcomes any heavy strain on the rear axle and tires.

Note the sweeping horizontal lines extending from the one-piece windshield to the rounded back, yacht-like lines obtainable only in the two-door type of car, which make it a genuine "streamline" body. Note the shape and size of the doors, that the hinges are concealed yet the handles are left exposed to break the monotony of the perfectly smooth sides. To overcome poor ventilation in the fore part of the body, which is unusually roomy, a new kind of ventilator is used. Louvres have never given real ventilation except in the hood.

Armored-Car Type Ventilators

This ventilator was suggested by the armor plates of the armored cars of Belgium. Its shape and size are in perfect harmony with the lines of the car and above all things it will give perfect ventilation. It fits flush with the sides of the body and is opened from the inside. It can be opened any distance up to right angles with the car. It slides on a brass bar with a screw-lock so it may be held perfectly rigid at all times. Of course the front seat is divided, left hand drive with center control is used, the steering column having a pitch of 33 deg. It is placed near the cowl, which has an instrument board within easy reach. The motor may be either of four or eight cylinders, generating its own electric light and having an electric starter, while worm drive with underslung cantilever springs and wire wheels are used. Since the body is very wide it extends over the chassis frame several inches, the space between the running boards and the frame being utilized for the tool boxes and batteries. The oil and gas are carried in a large tank in the rear which is built rigidly onto the frame. Note that the tire irons are also built onto the frame and that they are pitched forward. There is nothing more unsightly than to see one or two heavy tires hanging over the back of a car just as though they were ready to fall off. The entire body and hood are of cast aluminum with the radiator and other metal trimmings of brass highly polished. The color is preferably a light one with dark running gear. Very dark colors tend to hide the lines of a car if it has any.

This cannot help but show that there are yet many undeveloped possibilities in body design especially in the open types, and while cars cannot be built to suit individual opinions nor new ideas "rushed" on the public, now is just as good a time as any to produce the real streamline type.



Suggested type of streamline body containing a number of unusual features, the idea being the combination of artistic appearance and riding comfort

Fan Design Remains Unstandardized

Although Total Variation in Diameter Is Small There Are Many Intermediate Sizes

By J. Edward Schipper

ONE of the parts of the car which is absolutely non-standardized is the fan. If you take a dozen names of manufacturers at random, you will find that the fans are not only widely different for the same size of cars, but are different in diameter, the number of blades, pitch of the blades, and in the speed ratio at which they are driven. When a car is designed the draftsman draws a fan and it is turned over to the manufacturer with little attention. In many instances it would be difficult for the car manufacturer himself to tell why a certain type of fan has been adopted. The result is that nothing like standard, or even similar, practice will be found in cars of the same size and same cooling arrangement.

Naturally the fan diameter will be governed by the amount of space the designer is able to allow beneath the hood. The width of the radiator and its height must be carefully considered in order that there will be a draught through the entire radiator. As it is, however, this is not always accomplished. In some radiator and fan arrangements, there is a reverse flow through some sections of the radiator; in other words, instead of suction, there is ejection of air.

Definite Classification Possible

It can readily be conceded that it would not be possible to come down to one standard fan diameter. It would be possible, however, to make up a set of drawings which would embrace definite classifications of the types now in use, and would provide standard dimensions to work it. The best efficiency of the fan will be secured at a certain definite rotative speed, but even with an engine which revolves at varying speeds it would be possible to bring the fan speeds to whatever is desired by simply changing the ratio between the pulleys.

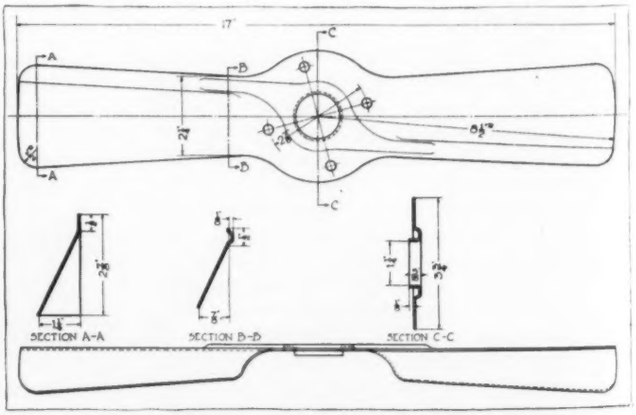
The accompanying tabulation was made up from a list of cars selected at random. It will be noted that the projected radiator areas vary all the way between 1.49 and 4.47 sq. ft. Taking care of these varying areas which represent the differences to be found between the smallest and largest cars, the variation in fan diameter is only a little over 7 in. for passenger cars, or between 14 and 21.125 in. The Knox tractor, which is included in the list, has a fan diameter of 24 in. Taking the passenger cars alone, a variation of 8 in. if gaged in steps of 2 in. could be divided into four diameters which might possibly be 14, 16, 18 and 20 in., if another size was needed, a 22-in. diameter could be used. The diameters used in the passenger cars listed are 14, 16, 18, 14.25, 19.625, 21.125, 20, 17, 13 and 19.5, or, in other words, nine different diameters, some varying from others by only 0.25 in. In this same set of fans, the number of blades runs all the way from two to six, exclusive of a sixty-four-blade Sirocco fan used on the Franklin. The pitches of the blades vary between 25.5 and 67 deg. to the plane of rotation. The ratios between the crankshaft and fan vary between 1 to 1 and 1 to 2.1.

Fourteen Variables

Ideal fan design to meet conditions such as obtain in a gasoline engine used in automobile work, where the speeds vary over a wide range, is such an elusive and impossible condition that it is out of the question. There are at least fourteen variables in fan design. These added to the varying quantities introduced by the requirements of an automobile fan render anything but empirical design impossible. It is of course true that there are several known conditions to be met. It is quite obvious that the fan has its greatest work to do when the motor is running on low gear. Another condition under which the fan must be efficient is when the motor is idling, with the car stationary. Again, the fan must do good work at ordinary touring speeds. Here are three different conditions of fan velocity under which good efficiency is required. These speeds are different for each motor and conditions are therefore anything but constant. Nevertheless, there are so many other variables entering into the necessary calculation, that no matter what fan is used it can be nothing better than a compromise and hence it would not be difficult to arrange a series of design which would cover all conditions and which would reduce the widely varying designs now on the market to standardized conditions.

Blades Are Factors

The question of blades will probably be one of the difficulties in the way of making compromise designs, but even if four standard sizes and pitches in two, three, four, five and six-bladed fans were made it would be a great step in advance. The light pressed metal fans depend upon a larger number of blades not only for efficiency but for spoke strength. The two-bladed aeroplane designs are favored where castings are used. Between these two extremes, there are all the types mentioned, and each has a large number of users. It seems that if any type could be abandoned it would be the five-blade as this is used by fewer concerns than any of the other types. The three-blade is not used to as large an extent as the four and six, but there is no doubt that higher efficiency at most speed ranges can be obtained with this type when considering the necessities of automobile design. The two-bladed fan is also a highly efficient type and a typical design of this sort is shown in the accompanying illustration.



Typical two-bladed fan used on the Hupmobile

Tabulation of Fan Dimensions, Showing Variation

Car	Model	Max. Hp.	Front Rad. Area, Sq. Ft.	Fan Dia.	Blades	Pitch	Crank-shaft to Fan Ratio
Buick	D-45	48	2.288	16	5	32°	1 to 1.5
Cadillac	51	70	3.43	19.5	6	25	1 to 1
Chalmers	26-C	53	3.1	18	3	55	1 to 2.25
Chalmers	32-B	47	2.44	18	3	67	1 to 2.25
Dodge	1915	35	2.08	16	6	24	1 to 2.3
Ford	T	20	1.82	13	4	25	1 to 1.71
Hupmobile	N-1916	40	2.46	17	2	..	21 to 19
Knox (Tractor)	35	..	4.23	24	4	30	1 to 1.65
Locomobile	48	82	3.93	20	6	30	1 to 1.5
Pierce-Arrow	A-3	..	4.47	21.125	6	60	1 to 1.375
Pierce-Arrow	B-3	..	3.74	21.125	6	60	1 to 1.375
Pierce-Arrow	C-3	..	3.37	19.625	6	60	1 to 1.375
Saxon	Four	18	1.49	14.25	2	25.5	1 to 1.828
Saxon	Six	34.7	3	14	4	25.5	1 to 2
Studebaker	1916-4	40	2.9	18	6	34	3 to 4
Studebaker	1916-6	50	2.9	18	6	34	3 to 4
Willys-Overland	83	35	2.63	16	6	34	1 to 2.1

The standardization of the fan, of course, has for its object the saving of money to both the manufacturers of automobiles and fans and for all practical purposes the only work which could be undertaken immediately in this direction would be that which would have effect on the costs of fan manufacture. The reduction in the number of pressed metal fan sizes to be made would be the first point to consider. To reduce the number of sizes, the first step would be to make four or five standard diameters, allowing the pitch and number of blades to remain matters of choice with the fan manufacturer.

Where the diameter is limited in this way, it would immediately give the fan manufacturers fewer sizes to work to and would no doubt result in a saving. In addition, the dimensions at the hub are also capable of standardization, particularly in the pressed metal designs. The bore of the fan and the dimensions of the bolt circle together with the bolt sizes and distribution are also susceptible of standardization since practice in mounting does not vary so widely that it could not be brought into line at this point.

The cast fans are more difficult to handle than the pressed metal design because when cast the design has been worked out to fit some particular mounting condition in most instances. Still, it might be possible that pressed metal and cast practice could be brought down to the same level as regards hub dimensions and bearing mountings. Where ball bearing fans are used, and this is rapidly becoming general practice, the bearing mountings are certainly a feature which could be well brought down to a limited basis.

Pitch Relatively Unimportant

No radical step such as making hard and fast rules for fan diameters pitches and numbers of blades could be thought of at the outset, but it is reasonably certain that with the diameters determined the number of blades used would begin to reduce itself to a standard quantity for fans of given dimensions. The matter of pitch is relatively unimportant in the pressed metal design because it is simply a question of bending the blades to the required angle. It is quite certain that the variations of pitch angle will not be so great but that a slight variation in the bending process will take care of the entire range of pitches. Referring to the table herewith, an angle of about 30 deg. to the plane of rotation seems to strike quite close to general practice.

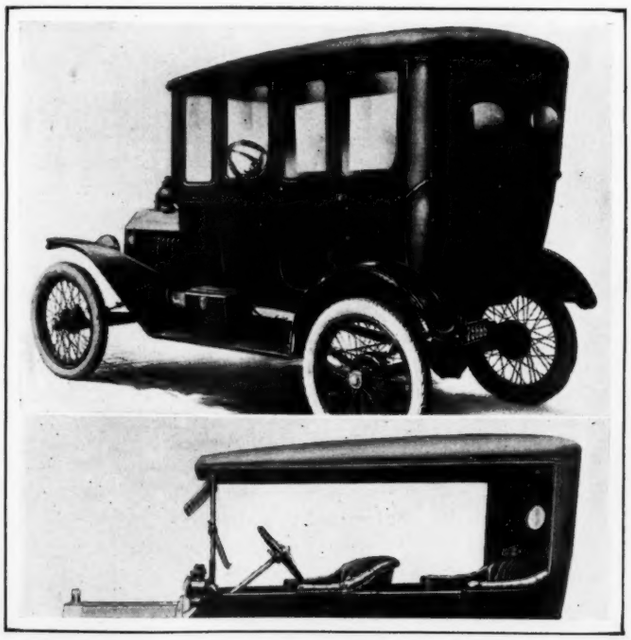
In spite of all these variations in pitch the problem as regards this matter is not one which need fundamentally to be examined until after the work of inducing fan manufacturers and automobile manufacturers to accept a series of graduated diameters for pressed metal fans which will cover the desired field and yet require only a few designs in place of the large number now in use. The standardization of the hub will also be of benefit to ball bearing manufacturers.

Weather-Proof Top for Fords

A TOP designed to make the Ford an all-year car in the strictest sense of the word has been brought out under the name of the limousine top for Fords, by the Detroit Weather-Proof Body Co., Detroit, Mich. It is an attractive and practical removable top which can be easily handled and sells for a moderate price. The top is designed to be of good appearance and to have attractive lines while at the same time having substantial workmanship.

The canopy frame work is made of wood and the braces are of light and strong sheet steel. The entire top and sides are covered with a high grade of imitation leather which is weather-proof. The inside lining is of fine gray cloth giving a very smart finish. The side panels are plate glass. The doors are a patent flexible design which slide noiselessly up and down, disappearing entirely from view when raised. It is possible with this door to open it partially for ventilation and it is claimed by the designers that with this arrangement the top has exceptional conveniences for ventilation. With everything closed, the car is entirely storm and weather-proof, but by removing the side panels and doors, which can be done quickly, a very handsome fair-weather top remains. A rain-vision windshield is included.

The limousine top for Fords which has been designed and built with a view of obviating any rattle can be put on by anyone who is able to handle a wrench and screwdriver and for owners of 1914 Fords a special cowl is supplied for a small additional sum. The tops sell for $77.



Limousine top for Fords open and closed

Simplicity Features Republic Trucks

Wide Range of Bodies for Every Class of Work

Side and plan views of the Republic 2-ton chassis, showing strong but simple construction

IN the passenger car field the big outputs of moderately-priced cars come mainly from factories where the assembly system of manufacture has been adopted, and it is reasonable to suppose that much the same industrial condition prevails in the truck division. But there is one striking difference, which makes it impossible for passenger car procedure to be applied to truck manufacture without any change in method and this is the fact that absolute single model specialization is an impossibility.

The assembler of truck chassis can make a wide range of sizes without great expense because the whole field of motor and parts manufacture offers him so wide a choice of components. Careful layout design enables the assembly process to be closely similar for quite a wide range of models, and the truck lacks the elaborate fittings and body parts of a passenger car, so it is possible to make half a dozen commercial vehicle models almost as economically as to make one only.

Acting on this principle the Republic Motor Truck Co., Alma, Mich., is able to produce a sufficiently wide range of vehicles to suit almost any sort of work at distinctly moderate prices, as instance the ¾-ton at $995 and the 2-ton at $1,830.

The Republic company is an upholder of the internal gear drive, using this type of axle on both chassis. Two makes of axle are used, the smaller truck having a Torbensen and the other a Celfor. All have unit power plants and large diameter tubular propeller shafts.

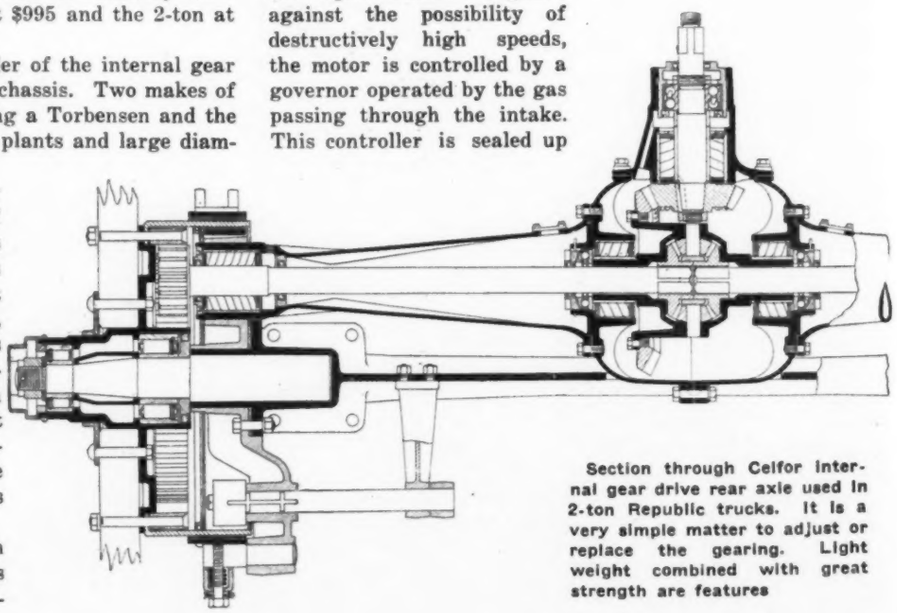
The choice of the internal gear axle has been dictated by the belief of the Republic company that its light weight in proportion to its strength is a very real advantage. It is easy to obtain a wide range of sizes, and another very large advantage is that the gear ratio is readily variable. To suit the size of the pinion and of the annulus gear to the district where the truck will be used is a simple and inexpensive process, and the ultimate renewal of worn gearing is equally easy.

Both the Torbensen axle used on the small chassis and the Celfor axles of the larger model have stout I-section forged members that carry the load, a light casing like a small passenger car axle containing the bevel gearing and the driveshafts. In the Celfor type this driving member is mounted in front of the dead axle and in the smaller Torbensen is located behind, the tubular driveshaft from the gearbox passing through the center of the dead axle which is enlarged and pierced for this purpose. All torsional and driving stresses are resisted by the ample rear springs and all shafts throughout the axle members are supported on roller bearings.

In the design of the axles there are no right or left hand parts, which means that bearings, brake bands, etc., are all interchangeable, and this further facilitates repairs or adjustments. Brakes are internal and external on drums which inclose the driving mechanism at each end of the axle and it is to be observed that the length of the various levers and the layout of the links enables a very powerful retarding force to be exerted without great effort on the part of the driver.

Motor Is a Continental

The motors used are Continentals, one size caring for the ¾-ton model, and a larger size for the 2-ton. Moderate size of motor and a fair crankshaft speed are favored because the high speed engine weighs less for its power than the slow speed kind. To guard against the possibility of destructively high speeds, the motor is controlled by a governor operated by the gas passing through the intake. This controller is sealed up



Section through Celfor internal gear drive rear axle used in 2-ton Republic trucks. It is a very simple matter to adjust or replace the gearing. Light weight combined with great strength are features

inside the intake pipe and has no external connections whatever, so it cannot be tampered with except by tearing down the assembly. The Stromberg carbureter bolts to the intake pipe and can be removed or replaced without any interference with the governor mechanism so the governor is practically integral with the cylinder block.

The difference in motor size between the two models is not great as the stroke is 5 in. in both, the bore of the smaller engine being 3½ and that of the larger 3¾ in.

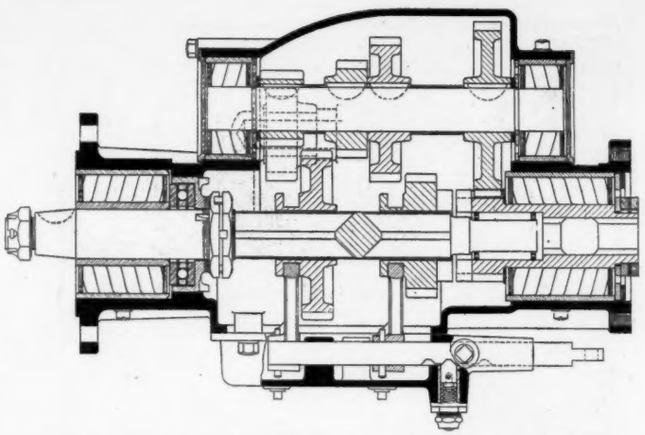
Crankcase of Aluminum

The governor is set to allow a maximum road speed of about 20 m.p.h. for the ¾-ton job, and about 17 m.p.h. for the 2-ton. The motors are L-head block types with individually accessible valves. To save weight the whole crankcase is aluminum, and in the interests of simplicity the water pump is dispensed with, ample syphon circulation being insured by large water ways within the cylinder casting and big outside pipes. Lubrication is a combination of forced and splash, the three main crankshaft bearings having a pressure supply while dip troughs care for the connecting-rod bearings. To the helical timing gears at the front end there is a separate lead from the pump, which latter is a plunger type operated from the camshaft. Ignition is by Bosch magneto, though a complete electrical equipment, including starter and Westinghouse lighting outfit, is obtainable for an extra charge.

A multiple plate dry disk clutch is housed in part of the crankcase that incloses the flywheel and the gearbox is bolted up on a bell housing. This, being small, is of cast iron, and provides three forward speeds, the control being central. Large roller bearings support the gearshafts which are of a special alloy steel and it is claimed that the gearset is designed to support a 50 per cent overload, a highly desirable feature for a commercial vehicle.

Frame Is Flexible

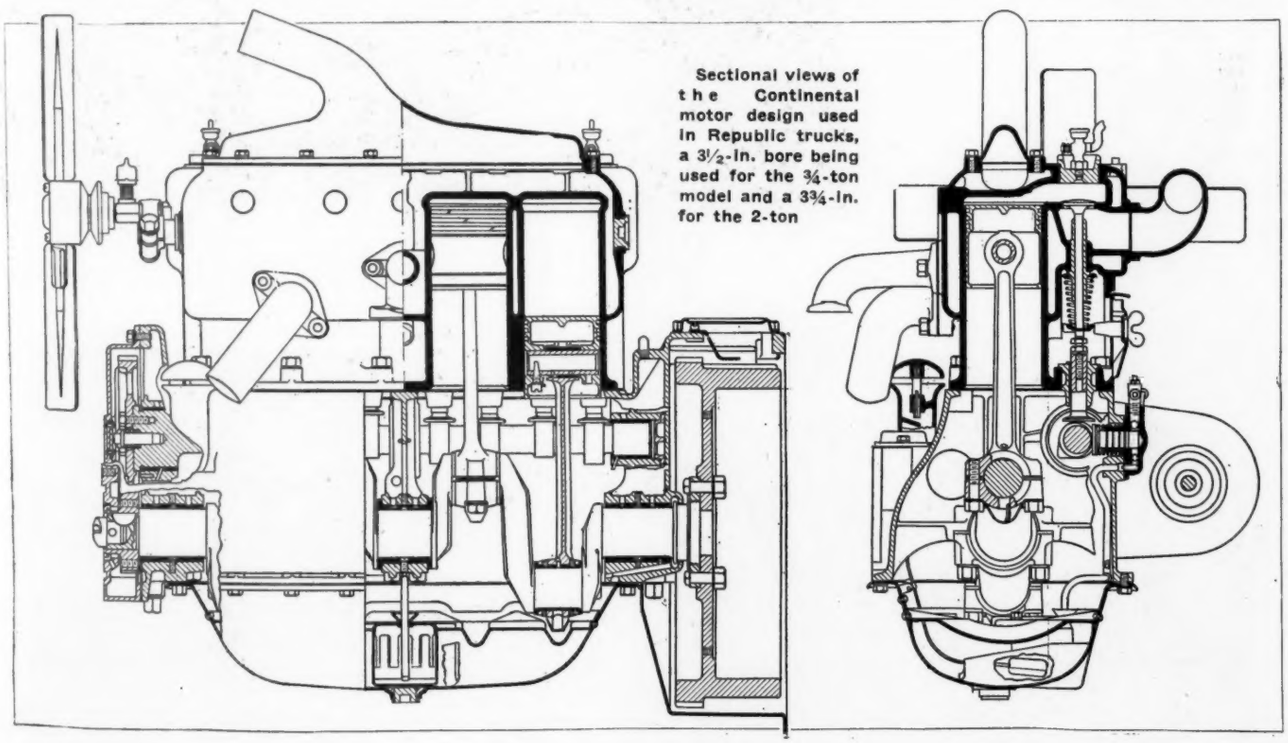
In the frame there is no rigid member, the disposition of the components being such that freedom to weave cannot affect alignment detrimentally. For the engine there is a three-point suspension, two motor arms lying close to the flywheel and a front end swivel being bolted to a cross member, but this same member is not used for the attachment of the radiator. It is essential above all else, that frame weave shall not affect the delicate structure of the cooling apparatus, so a special dropped, cross member is mounted in front of the motor support and the radiator rests on two pads about half the width of the frame apart. A recent change in Republic design is the substitution of a pressed steel radiator shell with a removable core for the integral design used previously.



Three-speed Covert gearbox used in the Republic trucks

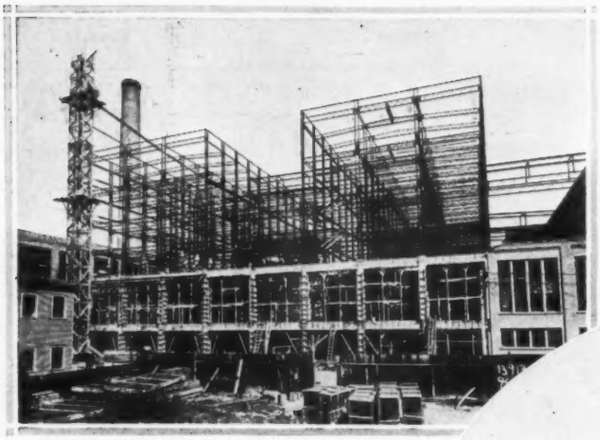
Wide Range of Bodies

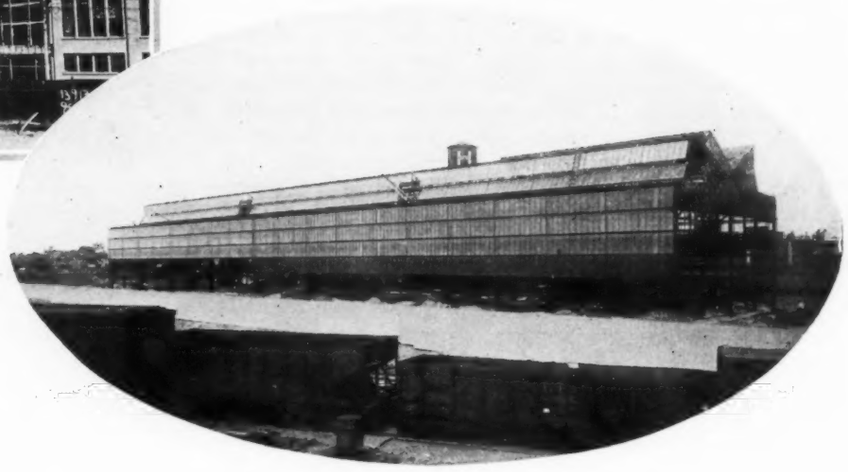
In details the Republic chassis are well cared for, there being no joint without its greaser, but more important still, there are a minimum of places that require lubrication. When the body is on, the only places that are in the least difficult of access are the universal joints, and these call for but infrequent attention. As regards the rest, ten minutes would more than suffice to care for everything. Of course the range of bodies available is wide. These are all made in the Republic plant and the company takes considerable pride in the quality of workmanship and the degree of finish.



Sectional views of the Continental motor design used in Republic trucks, a 3½-in. bore being used for the ¾-ton model and a 3¾-in. for the 2-ton

Some Recent Factory Building Operations

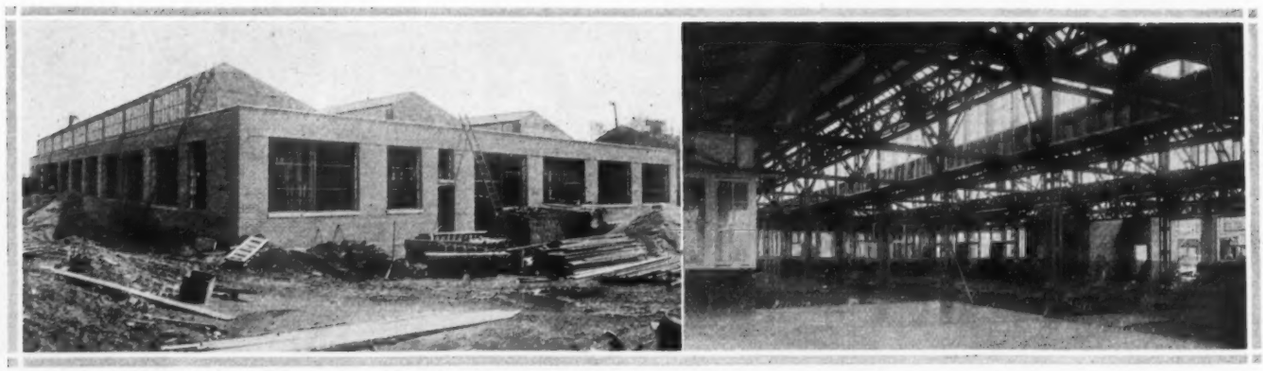




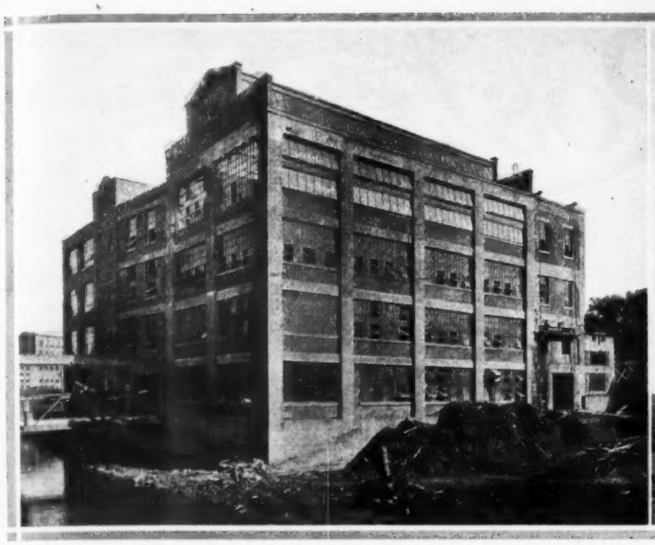
Above—One of the five additions to the factory of the Firestone Tire & Rubber Co., Akron, Ohio, which aggregate over 300,000 sq. ft. or 7 acres of floor-space. It is expected these additions will be completed before snow flies. Through these additions the present output of 7500 tires per day will be increased to 12,000 per day, a gain of 60 per cent.

Oval—Recent addition to the plant of the Hydraulic Pressed Steel Co., Cleveland, Ohio, which was originally designed to be 360 by 80 ft., the materials used being steel, concrete and glass. An interesting feature of this building is the fact that the contract called for its completion in 8 weeks but the contractor completed it in 42 days, thereby earning a bonus of $100 per day. Before the building was completed it was found necessary to enlarge it and the contract was let to extend it 200 ft. further, making it 560 ft. long and 80 ft. wide

Right—Plant of the Oakes Co., Indianapolis, Ind., which has added three large buildings, increasing the capacity of the plant to 2000 fans per day. The new plant contains new machinery, several 46,000-lb. presses, enameling ovens, etc. Several acres comprise the grounds and private railroad switches have been built

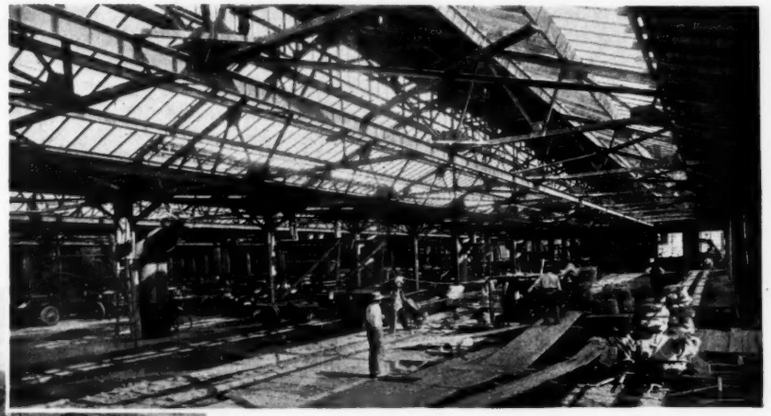


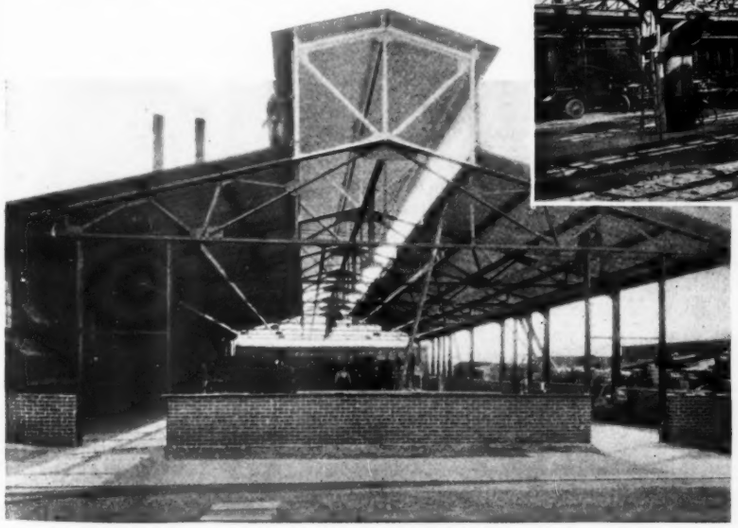
Above are illustrated the exterior and interior of the nearly completed addition to the factory of the Aluminum Castings Co., Cleveland, Ohio. The greatly increased demand for aluminum products and especially for castings of this metal for use in the automobile industry is taxing the facilities of the company to a marked degree



Above at the left is illustrated the addition recently completed by the New Process Gear Corp., Syracuse, N. Y. This structure is four stories in height and 120 by 100 ft. The main plant across the creek is connected with the new building by the bridge illustrated. Excavation at the right is for an additional five-story building, 180 by 100 ft.

Above at the right is the new four-story commercial car worm drive axle plant of the Timken-Detroit Axle Co., Detroit, Mich. The total floorspace is about 100,000 sq. ft., and with machine equipment the cost is about $500,000





Above—Interior of the new truck erecting department of the Packard Motor Car Co., Detroit, Mich. This building is 240 ft. square and of steel and glass construction. As shown in the illustration, over 100 trucks were run in on the completed portion of the new floor and given final adjustment as fast as the cement dried

Left—One of the two new factory additions of the Remy Electric Co., Anderson, Ind., which, like all the other Remy buildings except the administration structure, are one story high so that with high ceilings an exceptional amount of fresh air and light is admitted

Right—New storage battery plant of the Prest-O-Lite Co., Inc., Indianapolis, Ind., which will increase the total floorspace of the company's plant 45,000 sq. ft., or 33⅓ per cent. This addition, which will cost $60,000 and machinery $25,000, is to be completed Dec. 1, all construction being handled by the company's own engineers with the exception of the roofing. The company is at present turning out 400 storage batteries per day, and this output will be greatly increased by the added facilities

The Rostrum

Reasons for Motor Overheating

EDITOR THE AUTOMOBILE:—Will you kindly publish a wiring diagram of the Coey Flyer 1916 model? This car is new and has a starter which never did work. I think that the wiring has been tampered with in transit.

2—Also, the motor heats up on level or down grade and won't pull at all on a hill or up grade. It does not miss and the motor idles nicely, but when it starts up hill the engine seems to choke up and stop. It does this on low gear with wide open throttle. The mixture smells too rich and the carbureter is a Carter with dash control. Have tried the control in all positions.

E. Palestine, Ohio. G. E. M.

—The wiring of the diagram you request is published in Fig. 1. It would be well to see if the coil is securely grounded to the angle platform as the system on the Coey is grounded throughout. The ignition wiring diagram is in the cover of every coil box and the diagram shown is for the lighting and starting system.

2—The reasons which may be assigned to the trouble you mention are:

a—spark is retarded too much.

b—float too high in the float chamber.

c—hot air pipe giving too hot a mixture.

d—spark shorting across terminal inserts in distributer.

To eliminate the first trouble, the igniter should be advanced on the vertical shaft as far as possible and carried practically up to the point where an ignition knock develops.

The second trouble may be remedied by adjusting a small knurled nut on the top of the float chamber to the point marked *L* or to the point where you obtain the best results.

The third trouble if it is from that, can be remedied by taking off the hot air pipe until the weather becomes cooler.

The fourth trouble can be remedied by cleaning and sand papering the inside of the distributer until it is perfectly smooth.

Gathered Wheels for Easy Steering

Editor THE AUTOMOBILE:—Why is the distance between the front wheels of an automobile greater at the top then at the bottom?

2—How are the valves of a four-cycle engine re-timed?

3—What is a floating rear axle?

4—What is the difference in connecting the battery cells in series or in parallel?

5—Will you explain the method of changing from high to low speed when a sliding gear transmission is used?

F. Warren, Mass. W. N. T.

—The reason for this is to make steering easier. The object of tipping the wheels in this manner is to bring the point of contact between the wheel and the ground in a vertical line below the axis of the steering knuckle. When the line of the center of the steering knuckle produced is coincident with the contact of the tire and the ground, there is less tendency for the wheel to be thrown out of line when an obstruction is met on the road.

2—By re-timing the valves you probably refer to bringing them back to the original time of opening and closing after the timing for some reason has been disarranged. On the flywheel of the motor there are marks which indicate the actions of the valves when these marks register with a fixed point on the engine frame. Taking for instance the mark I. O. 1. This indicates that when this mark registers with the permanent point, the inlet valve on No. 1 cylinder is just starting to open. Therefore, with these two marks registering, the camshaft gear must be turned until the camshaft is in such a position that the inlet cam on No. 1 cylinder is just starting to open the valve. The gear is then slipped back into mesh and the motor is timed.

3—THE AUTOMOBILE published in the issue for Sept. 9, on page 472, an article explaining the different types of axles. The floating axle is one in which all the weight is taken upon the axle housing and the wheel bearings are mounted on the outside of this housing. The axle shaft only transmits the driving torque and therefore the shaft can be withdrawn without altering the position of the wheel.

4—When batteries are connected in series, the positive poles of one cell are connected with the negative of the next, and so on. When in parallel all the negatives are connected and all the positives. Connecting in series gives the effect of adding the voltages while connecting in parallel adds the amperage. Thus, if six 1-volt cells were connected in series, the result would be a 6-volt current while in parallel the voltage would be about 1.

5—In changing from high to low speed, when a sliding gear transmission is used, the process merely consists of taking out the clutch by depressing the clutch pedal and bringing the shifter lever back in the gate to secure the low gear mesh. If there is difficulty in doing this without noise the clutch should be merely slipped a little and not entirely withdrawn. Move the lever with a moment's pause in the free position and the clutch will speed up to suit the faster revolution of the lower gears; or increase the motor speed while in neutral with clutch momentarily engaged.

Troubled with Explosions in Muffler

Editor THE AUTOMOBILE:—I have a 1913 Studebaker 35 and am troubled with explosions in the muffler. I have ground in the valves and have tried adjusting the carbureter and valves without effect.

I get the explosion whenever I cut down the gas and particularly in going down hill. Am using an exhaust horn. Would this have any effect upon it?

2—I also have a 1914 Buick truck which does not start on the battery without spinning it for 3 or 4 min., but will start quite easily on the magneto and will run after starting on either magneto or battery. Can you tell me what the trouble is and how I could remedy this?

Allston, Mass. F. W.

—The only reason for getting an explosion in the muffler is that an unburned charge has found its way into this part of the car. This means that the cylinders are not firing regularly and consequently that there is trouble with the functioning of either the carburetion or ignition. It would be well to examine the spark plug points to see if they are not too far apart and also to adjust the carbureter so that the motor fires regularly on all four cylinders. The exhaust horn

has nothing whatever to do with the muffler explosions which are due to the fact that an unburned charge escapes into the muffler to be followed by a hot exhaust which explodes the unburned charge in the muffler.

2—No doubt the batteries are weak and need renewal.

Setting Loosened Automobile Wheels

Editor THE AUTOMOBILE:—Kindly give me the proper method of setting automobile wheels that have loosened in the felloe and hub.

2—Give me the timing of the 1910 4-40 Locomobile.

Manhattan, Nev. F. C.

—This work will have to be done by a competent wheelwright who will have to thoroughly go into the causes of the loosening before he can make a repair. It would be dangerous to attempt to do this work yourself as the failure of the wheel might result, with serious consequences.

2—The timing of the 1910 4-40 Locomobiles is as follows: Admission opens on top center; admission closes ⅜ in. past bottom center; exhaust opens ¾ in. before bottom center, and exhaust closes ⅛ in. past top center.

Complete Circuit for Splitdorf Ignition

Editor THE AUTOMOBILE:—Will you kindly publish sketch showing the complete circuit for a Splitdorf coil, showing both battery and magneto circuits?

Barberton, Ohio. F. S.

—You do not mention the model magneto you refer to nor whether you are using the dash transformer or the tube transformer. A typical wiring diagram for each is given in Fig. 2.

Operation of Chevrolet Electric System

Editor THE AUTOMOBILE:—I have recently bought a Chevrolet roadster and would like to get a simple description of the workings of the electric starting, lighting and ignition systems used on this car; Auto-Lite and Connecticut ignition.

If such descriptive articles have appeared in THE AUTOMOBILE please mention issue.

Washington, D. C. J. S. C.

—The starting, lighting and ignition system is composed of the Auto-Lite for cranking and lighting and the Connecticut for ignition. The Auto-Lite lighting and cranking system is the two-unit type, an electric motor connected through the Bendix drive with teeth in the flywheel rim, serving for rotating the crankshaft and a separate generator driven by helical gearing providing current for lighting and ignition. The latter has in unit with it a Connecticut coil and distributer to take care of the ignition. A complete description of the Chevrolet line appeared in THE AUTOMOBILE for Nov. 26, 1914, on page 989.

Weights of Franklin Power Plants

Editor THE AUTOMOBILE:—Kindly publish the weight of Franklin series five and eight motors, no electrical equipment for lighting and starting in either case.

Chula Vista, Cal. H. A. SPRAGUE.

—The weight of the Franklin motors is always computed as assembled completely with the clutch which is housed in the flywheel. Including the starter, the series 5 Franklin motor weighs 634 lb. The series 8, 642 lb. The starter alone for the series 5 weighs 92 lb. and for the series 8, 58 lb. These figures do not include the battery unit.

Building High-Speed Light Six Racer

Editor THE AUTOMOBILE:—I contemplate building a small bore, high-speed racer. I want to use a small light weight, high-speed motor of 3 by 5 bore and stroke, six-cylinder, delivering its maximum power at 3000 r.p.m. I contemplate using a 3 to 1 gear with 32 by 4 tires. Is this type of motor suited for this work and is this gear too big? Any other information along this line would be greatly appreciated.

Tompkinsville, N. Y. G. S.

—The best way to proceed is first to build the motor, then place it upon the block securing the horsepower curve after which the gear ratios can be laid out so that the motor is capable of operating at the peak of the horsepower curve when the maximum effort is desired. The arrangement of the manifolds, gas passages, etc., have so much to do with the motor that it will be impossible to predict the performance in advance.

Extreme Bore Limited by Practice

Editor THE AUTOMOBILE:—Would you kindly advise me the extreme bore regardless of the length of the stroke which could be used in a motor to come under the 300 cu. in. piston displacement?

Orchard Lake, Mich. C. H. B.

—By this you no doubt mean to infer that the motor must be within the limit of practical design and since you do not mention the number of cylinders, a four-cylinder motor will be assumed. Taking a motor of 3-in. stroke as being about as little as possible to come under the head of even reasonable practice, the bore of such a motor would be 5⅝ in. to give a displacement of 295.2 cu. in.

Information on a 1908 Pope-Toledo

Editor THE AUTOMOBILE:—Will you kindly furnish me with the following information regarding a 1908 Pope-Toledo four-cylinder motor, 4⅞ by 5?

1—Center to center distance on the tie rod.

2—Timing of valves.

3—In the bore of the driving gear on the camshaft are

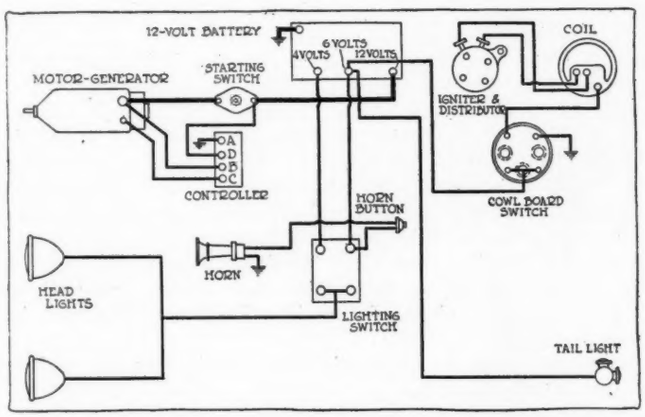


Fig. 1—Wiring diagram showing the connections on a Coey flyer 1916 model

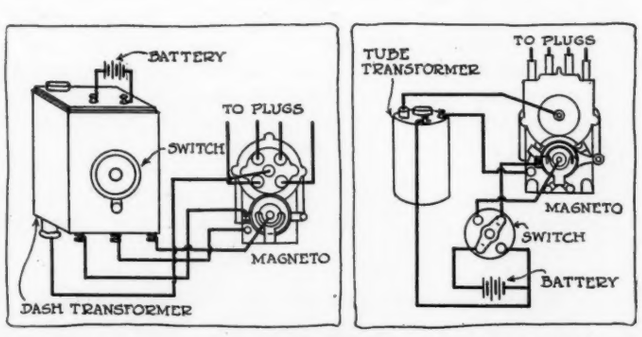


Fig. 2—Circuit connections for Splitdorf dual ignition with tube and dash transformers

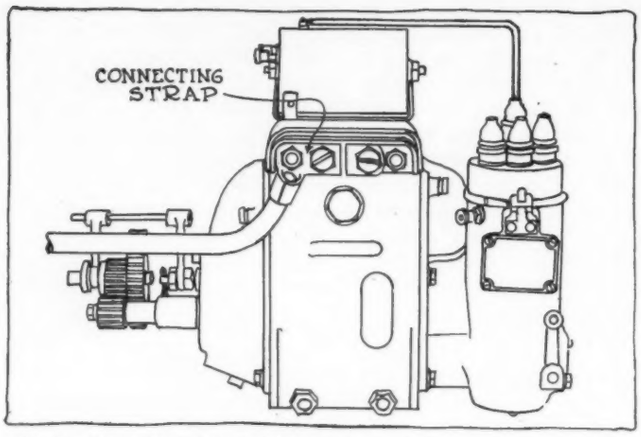


Fig. 3—Connecting strap which is cut on Delco system in installing an ammeter

two keyways. Are these intended for setting for high or low speed?

4—Center to center distance from rear to front axle spindles.

5—Principles and operation of the oiler with which this machine is equipped. It is a five-feed oiler with a single pump, but the oil is delivered through individual sight feeds. It would appear that it is forced under a small piston inclosed in the sight feed glass which rises under the pressure. The top of the piston shows a white telltale and the oil is by-passed under the piston to the delivery tube.

6—Is the auxiliary dash tank equipped with any form of automatic shutoff to take care of pressure delivery from the rear tank?

7—The splash oiler does not appear adequate to properly supply oil to the crank throws and it is contemplated installing a high pressure single-cylinder pump connected by manifold to the crank throws and camshaft bearings. Is this advisable?

8—When reducing the load on the chassis is it possible to remove some of the spring plates?

Camden, N. J. W. S. C.

—The distance, center to center, on the tie rod is 46¼ in. The dimensions of this motor are 4⅞ by 5¼ in.

2—The timing of the valves is as follows: The exhaust opens ½ in. before center, and closes ⅛ in. past center. The intake opens 1/16 in. past center and closes according to above. This is measured on the flywheel.

3—In the bore of the driving gear on the camshaft are two keyways. These are not intended for setting the high or low speed.

4—The center to center distance from the rear to the front axle spindles is 125¾ in.

5—The oil in the five-feed oiler is forced under a small piston inclosed in the sight feed glass which rises under the pressure. The top of the piston shows a white telltale and the oil is by-passed under the piston to the delivery tube.

6—The auxiliary dash tank is equipped with any form of automatic shutoff and will take care of pressure delivery from the rear tank. It is not advisable to install a high pressure single-cylinder pump connected by manifold to the crank throws and camshaft bearings.

7—No.

8—It is suggested that you install new springs when reducing the load in the chassis, and we would not advise removing the spring plates.

Wants to Install Ammeter on Delco System

Editor THE AUTOMOBILE:—We have a Buick 37, 1914 model, equipped with Delco system and would like to install an ammeter showing the charging rate, but not to show a discharge when the starter pedal is pressed down to start the engine.

Iuka, Kansas. M. & P.

—The accompanying wiring diagram shown in Fig. 4, gives the connections necessary to install the ammeter. In order to make this operative it is necessary that the brass strap connection between the motor terminal and the generator terminal on the side of the motor generator be cut. This is a very easy matter with the later types of these instruments where the strap is on the outside, but which will be considerable labor if the instrument is of the earlier type in which the connection is on the inside of the frame.

A diagram showing how this may be connected on the Delco system is given in Fig. 3.

Zip Motor Built in Detroit

Editor THE AUTOMOBILE:—Can you tell me who built the motor and who built the wheels for the Zip cyclecar? Is it possible to replace the bearings in these wheels without removing the spokes first?

2—What size Hess-Bright ball bearings would fit these wheels?

Pueblo, Col. L. C. J.

—You do not state the model you are driving. The Zip Cyclecar Co. discontinued operations last November, although the service business is at present being continued by H. A. Huebotter, 2110 Main Street, Davenport, Iowa. The twin-cylinder air-cooled motor was made by the Universal Machinery Co., Milwaukee, Wis. The four-cylinder water-cooled motor was built by the Hermann Engineering Co., Detroit, Mich. The wheels were made by the Standard Welding Co.,

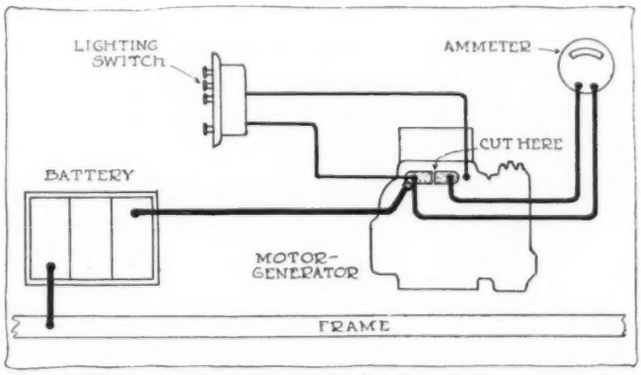


Fig. 4—Wiring diagram showing the location of the ammeter connections on the Delco system

Cleveland, Ohio. The cups of the wheel bearings cannot be taken from the hub without disassembling the wheel and it is generally preferable to replace the wheel altogether. Prices on the different parts can be obtained from the address given. No record of any experiments with annular ball bearings in these wheels are on file.

Piston Displacements of Racing Cars

Editor THE AUTOMOBILE:—What is the bore and stroke of the four racing cars, Mercedes, Peugeot, Delage and Bugatti?

2—What piston displacement have they?

3—How many cylinders?

4—What radiators do they use?

5—Do six-, eight- and twelve-cylinder cars compete with four-cylinder cars on the Chicago board track providing the piston displacements are the same?

St. Louis, Mo. A. L. E. B.

—Bore and stroke of the 4.5-liter Peugeot is 3.62 by 6.64. The new Peugeot racers known as the 3-liter cars, have bore and stroke of 3.07 by 6.13. The Bugatti has a bore of 4 in. and a stroke of 5.937. The Delage has a bore of 3.65 and a stroke of 7.1 and the Mercedes is 3.69 by 6.3.

2—The piston displacements are as follows: Mercedes 270.9; Peugeot 183 and 274; Delage 299, and Bugatti 298.

3—These cars are all four-cylinder types.

4—The radiators are not alike and THE AUTOMOBILE has no record of the manufacturer.

5—The racing rules do not limit the number of cylinders, merely providing a piston displacement limit.

Starting on Compression Not Harmful

Editor THE AUTOMOBILE:—Does starting the engine of an automobile on compression affect the engine in any way?

Dallas, Tex. W. B. S.

—This method of starting will not harm the motor, although at one time its effects were seriously considered. The general consensus of opinion is that the explosion is so much weaker than the ordinary one that no harm could possibly result.

Brake and Drawbar Horsepower

Editor THE AUTOMOBILE:—Please explain the difference between brake horsepower and horsepower at the drawbar? Also, is the horsepower the same for all manufacturers and is its value 550 ft.-lb. per second?

Rock Island, Ill. C. H. H.

—Brake horsepower signifies the horsepower delivered by the crankshaft of the motor and is generally measured upon some form of braking device such as the Prony brake or some type of dynamometer. Horsepower at the drawbar is generally a measure of the towing power of the vehicle.

Horsepower means the same to all manufacturers as it is a definite quantity meaning 33,000 ft.-lb. per minute, or 550 ft.-lb. per second.

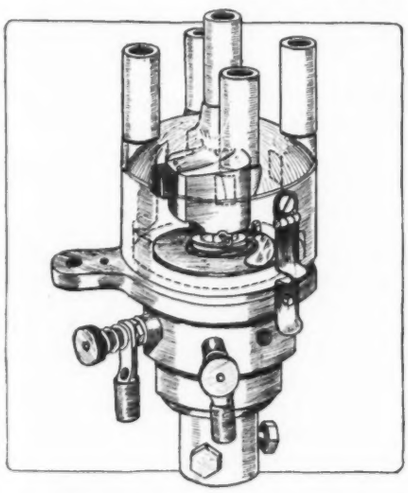
Timing of the Two-Speed Model A Krit

Editor THE AUTOMOBILE:—Please give me the timing of a Krit model A two-speed motor? Kindly show the position of crank throw as spark occurs in the first cylinder.

Marion, Ohio. D. G. T.

—The spark timing of this motor is such that the explosion occurs when the piston is within 3/32 in. of completing the stroke. This will enable you to set your ignition timing accordingly.

New Connecticut System Is More Compact



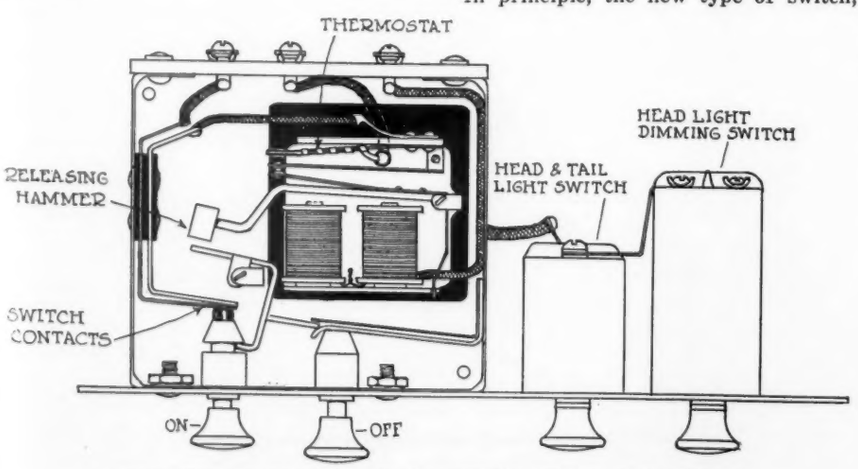
New Connecticut igniter housing which has a rounded top for the reception of the leads to the spark plug. This improved design eliminates the gathering places for moisture and dust and is an improvement over the flat top design

THE Connecticut Telephone & Electric Co., Meriden, Conn., has brought out an improved type of its automatic ignition system which is considerably simplified and more compact than previous types. The principle has not been altered, the improvement having to do only with mechanical construction.

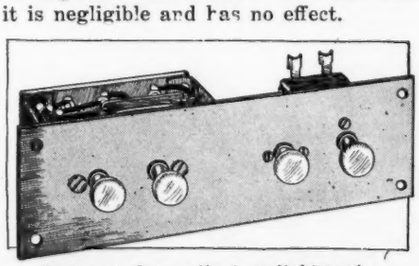
The igniter housing now has a rounded top for the reception of the leads to the spark plugs, this form being an improvement over the flat top in that it provides no lodging place for moisture and dust, etc. At the same time, the housing which carries the distributer segments has been made lighter. The distributer arm also has been lightened and made more compact. Other improvements include the adoption of a new type of compression lock washer holding the cover plate over the breaker mechanism in place and a new type of inclosed ball bearing at the lower end of the driving shaft.

In principle, the new type of switch, which is in addition to the standard round type, is exactly like the older one except that it is mounted entirely behind the dash with nothing in view except a plate and four switch buttons. One of these serves to make the ignition circuit and another to break it. A third button switches on head and tail lamp and the fourth button dims the head lamps for city driving. Any combination of lighting switches can be incorporated in the switch plate.

When the ignition switch is closed, current drawn from the storage battery is caused to pass through a tiny thermostat on its way to the coil and thence to the distributer and finally to the plugs. If the motor is not started within a short time after the switch is closed—the length of time is easily adjustable—the thermostat closes a circuit through a tiny electric buzzer operating a releasing hammer which automatically opens the ignition circuit and thus prevents the battery draining itself. Obviously, if the motor is stalled and not again started, the thermostat will open the circuit in the same way. Thus, it is impossible for the motor to stand idle for more than a minute or so with the ignition switch closed. When the motor is running the amount of current passing through the thermostat is so small that it is negligible and has no effect.



Connections for the automatic thermostatic ignition switch release



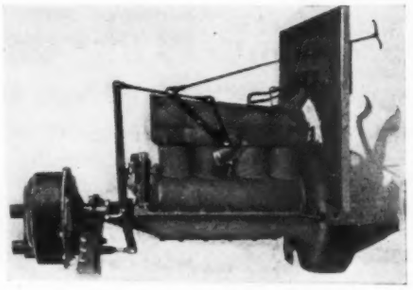
Compact Connecticut switchboard

ACCESSORIES

Cleveland Starter for Fords

UNDER the name of the Cleveland spring cranker a starter has been brought out for Ford cars which derives its power from a flat chrome-vanadium spring 2½ in. wide and 12 ft. long. This spring is coiled like the main spring in a clock, one end being fastened to the steel case and the other to an extension of the crankshaft. The winding is accomplished by a pawl and ratchet arrangement which is released by a trigger on the dash.

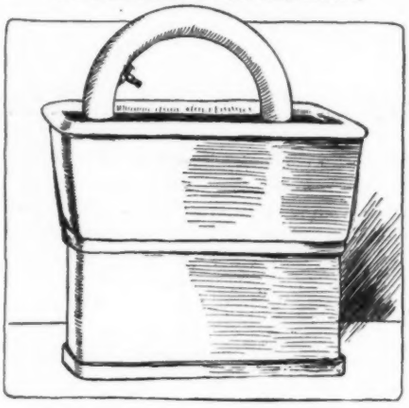
When the motor starts running under its own power the spring automatically rewinds, and when fully wound the apparatus ceases to operate. The rewinding takes from 20 to 30 sec., according to the speed of the motor. The price complete is $45.—The Forest City Electric Co., Cleveland, Ohio.



Cleveland starter on Ford motor

Ideal Tire Testing Tank

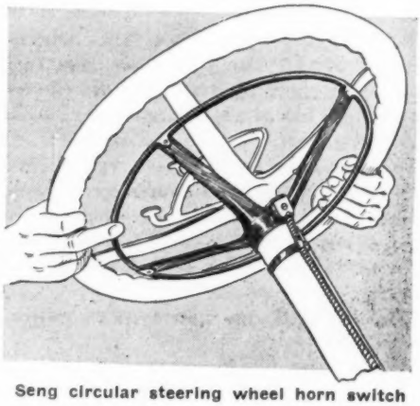
For a garage convenience there has been brought out a tire testing tank of porcelain under the name of Ideal. The white porcelain background reflects instantly the bubbles as they arise from the leak in the inflated tube. The porcelain used in these tanks is highly glazed so that its surface may be cut clean and white without any trouble. The tank stands 30 in. from the floor and will hold the largest tube. Its height from the floor to the top of the rim is 32 in.; inside depth is 15 in.; inside width, 8 in.; length over all, 36 in., and inside length, 32 in. To connect this fixture with the sewer a 1½-in. trap should be used. It may be filled with water by hose or overhead swinging faucets as desired.—The Trenton Potteries Co., Trenton, N. J.



Ideal porcelain tank for tire testing

Seng Circular Switch

The Seng ring, of smaller diameter than the steering wheel, is placed under the wheel and concentric with it; its diameter is such that it is conveniently reached by the fingers. Pressure on it closes the horn circuit and sounds the signal; the pressure may be applied at any point, and the position of the steering wheel makes no difference. Price $3, Ford type $2.50.—W. P. Seng, Chicago, Ill.



Seng circular steering wheel horn switch

Line Wheel Aligner

The Line tool for testing the alignment of the front wheels of a car consists of a tubular shank with the ends bent at right angles and carrying adjustable pointers which can be applied to the rims, obtaining true measurements and eliminating the uncertainty due to measuring from tires which are not perfectly true. The vertical adjustable rods are graduated, as is also one of the horizontal pointers. The bent shank facilitates getting the measurement at the rear of the wheels. Price, $10.—Mechanical Utilities Corp., Chicago, Ill.

Holophane Reflectors

A heavy metal reflector, designed especially for outdoor work where it will be subjected to the action of the weather, is one of the products of the Holophane Works. Heavy porcelain enamel is used on all the surfaces, white inside and green outside, with the exception of a copper nut at the top. This reflector is suitable for headlights and is detachable.

The nut is tapped for ½-in. pipe connection and is locked to the reflector by a bearing of ample surface. By using four lights around a car an excellent illumination is obtained. The angle type, 12¼ in. in diameter and 14½ in. deep, is suitable for such work. A lamp for use in this work is turned out which has 200-watt argon-filled Mazda light. The list price of the reflector is $4 each.—General Electric Co., Cleveland, Ohio.

Camp Bed for Small Cars

A canvas bed, utilizing the seat cushions and braced by iron rods, is slung under the raised top of the car and affords comfortable sleeping accommodation for two persons. The makers state that it can be put up in about 3 min. When not in use the bed can be rolled into a compact bundle and stowed on the running board or any other convenient place.—Price, Ford type, $7.50; other small cars, $8.50.—Auto Bed Co., Bellingham, Wash.

Stevens Duplex Reamers

A new line of reamers specially designed for repairmen handling Ford cars has been brought out under the name Duplex. Among others, two reamers are for fitting of the spindle bodies and spindle arm bushings. The diameters of the two reamers which are contained in the one tool are 0.564 and 0.506 in. The reamer is supplied with both

Line aligning tool for testing parallelism of front wheels

straight and twisted flutes. Other reamers made by the same concern are plain and expanding types of special Ford sizes for use on worn or refinished parts. These are used in work of various bushings in the Ford car and can be brought up to 0.005 in. over size when desired.

To meet the demand for a cylinder reamer that can be used in an ordinary drill press the same concern is marketing one which is made with inserted blades having a cutting angle in clearance requiring but little power to operate. This reamer is fitted with a No. 4 Morse taper reamer shank, and the maker states that it will ream the Ford cylinders accurately in 15 min. It enables the reaming of cylinders for taking 1/32-in. oversized piston. The prices of the above tools are $2 for the Duplex reamer, prices on request for the plain and expanding reamers, and $16 for the cylinder reamer.—Stevens & Co., New York City.

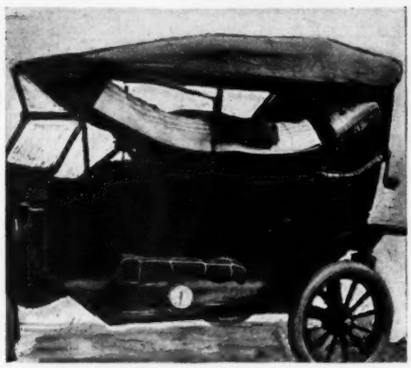
Norton's Spring Leaf Spreader

The leaves of the spring require lubricating as well as any other part of the car, for if they become dry they are likely to rust together, preventing free sliding and increasing the tendency toward squeaks. Springs which have become rusty between the leaves cause hard riding which in turn results in worn tires and finally broken springs. With this spring leaf spreader, the heaviest springs can have the leaves separated widely enough to insert graphite, the best known lubricant for this purpose.

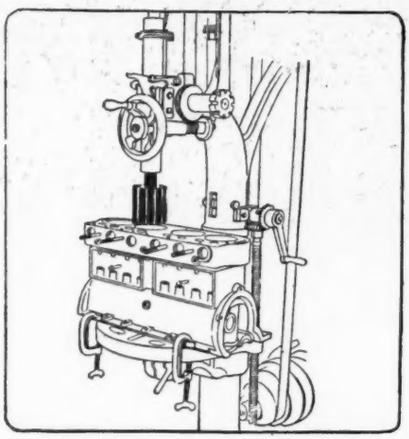
As shown by the illustration, the tool is complete in itself, being strong and serviceable and designed to resist wear. The spur or wedge is of chrome nickel steel while the lever which spreads the leaves is a hard steel casting. The end of the lever is a cam enters itself on one side of the spring and at the same time draws the spur in on the other. The price of the tool is $2.—I. S. Spencer's Sons, Guilford, Conn.

Tempco Spark Plug Brush

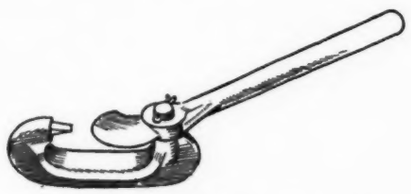
A spring steel wire brush set into a malleable iron handle and designed for cleaning carbon and other foreign matter from spark plugs is the Tempco. The end of the handle is forked and forms an alligator useful for turning small nuts, such as terminal nuts. The head terminates in a screwdriver tip, which is useful for adjusting spark plug points. The brush sells for 40 cents.—Tempco Mfg. Co., Chicago, Ill.



Canvas bed for use on small cars. It is illustrated folded and unfolded

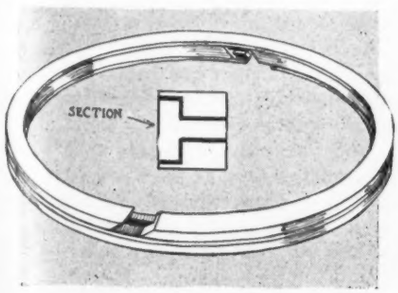


Stevens cylinder reamer for Ford motors

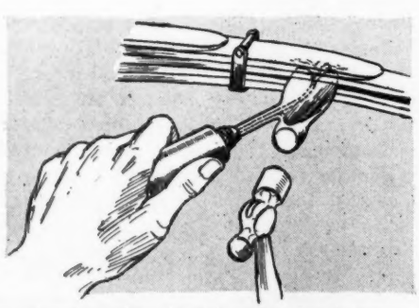


Norton spring leaf spreader for lubricating the leaves

Tempco steel spark plug brush



Trump piston ring, showing section



Tomahawk wedge-shaped spring lubricator

Trump Triple Piston Ring

Made in three sections. The central section is of T-shaped cross section, having flanges which fit into recesses in the two outer sections. All are diagonally split and the joints are set at equal intervals. The sections are concentric. The ring may be applied complete, as if it was of ordinary construction, or it may be put on one section at a time. The makers state that the interstices between the rings hold oil which forms a seal. The rings are 75 cents each.—Trump Mfg. Co., Crown Point, Ind.

Tomahawk Spring Lubricator

A wedge-shaped spreader for leaf springs has a forked edge, in which is a hole for the passage of grease; the spreader head is attached by means of a short shank to a cylindrical grease container, a passage through the shank conveying grease to the outlet in the fork. A twist of the container forces grease through the passages and out at the spreader. The butt of the spreader is made so that it can be hammered to force the tool in. Soft graphite grease is recommended for the work. Price, 75 cents.—C. W. M. Co., Buffalo, N. Y.

Marvel Body Cleaner

This cleaner is a liquid which the maker states is non-poisonous and non-volatile and which, when applied to varnished body work with clean waste and wiped off with dry waste, is designed to remove all dirt and leave a polished surface. It is intended to take the place of ordinary washing and cleaning in addition to furnishing the polishing feature. It sells for $3 per gal., $1.75 for ½ gal., $1 per qt.—Drew Auto Supply Co., Brooklyn, N. Y.

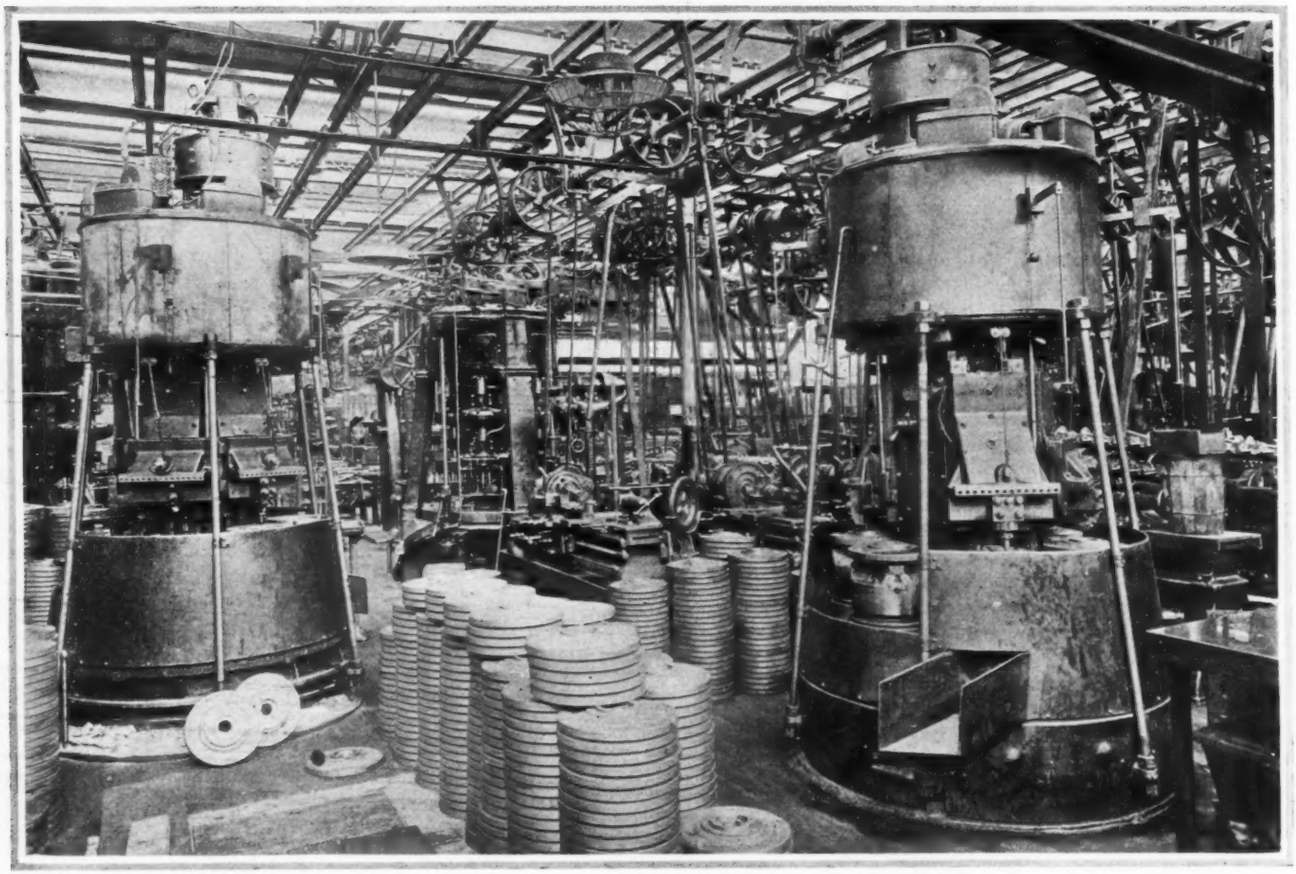
Efficiency Gas

While this method of lubricating is not new, the makers of Efficiency Gas state that their product mixes with gasoline much more thoroughly than does ordinary lubricating oil and that it vaporizes in the cylinders and is deposited on them; a film is formed on the walls of the combustion chamber and, the makers assert, prevents the adherence of carbon.

It is stated that Efficiency Gas will thoroughly mix with gasoline without stirring or otherwise agitating it; that it will not gum up the needle valve or other parts of the carbureter; and that it will thoroughly lubricate the cylinders. One gal. is sufficient for treating 640 gal. of gasoline. The price is $4.50 per gal., $2.50 per half gal.—Gas Engine Efficiency Co., St. Louis, Mo.

Big Turning Machine Saves $250 Daily

Bullard Multimatic Machines Ford Flywheel in 1 Min. 44 Sec.



A COMPARATIVELY new tool is the Bullard Multimatic illustrated above, its object being to enable the rapid automatic production of flywheels or similar parts, the only handling required being the insertion of rough castings and removal of finished work. Essentially the machine consists of six vertical spindles akin to those of a boring mill, but arranged on a circular table. This table is itself on a center and is used to bring the work into seven successive positions. There are six tool carriers located on a massive frame that forms the upper part of the machine so of the seven revolving work spindles six are in position at one instant beneath different cutters and one is idle.

Method of Operation

From this brief description and the illustrations the action of the tool is made obvious. To start work a flywheel in the rough is placed on the open work table and the first indexing movement of the large circular table brings the casting under the first tool. While this is at work on the first operation the attendant places a second rough casting on the next work table and at the next indexing this is carried one stage forward while the first wheel is carried on to a position beneath the cutter for the second operation. At the seventh indexing the first wheel comes opposite the operator in the finished state and he has merely to remove it, substituting a fresh casting.

Needless to say, such a gigantic machine is only of value where fairly large output prevails, but in the Ford plant it is stated that the first two machines to be installed saved $250 a day. In a 10-hour day it is possible to produce nearly 1,000 flywheels from one machine. The price of the tool is about $8,000 but in writing the makers some 6 months after the first installation the Ford company said that the cost of the first two had been worked off. Similar equipment is to be found in several other plants and one of the Multimatics will be used in Packard production for this season.

This tool is a particularly good example of the type of new machinery which is assisting to cut down the cost of manufacture mentioned in THE AUTOMOBILE article last week which dealt with the reasons for the reduced prices prevailing in 1916 model cars.

Had it not been for the great pressure of war orders on all branches of the engineering trade of America it is probable that a much larger number of machines similar to those illustrated would have been available for the rapid and economical production of other parts. It is only recently that the automobile trade has had special attention from the machine tool manufacturer, and the latter is certain to devote more of his time to studying it as soon as the present state of affairs relaxes a little. The production of crankshafts, gears and special work of a like nature could be speeded up greatly by new processes and the quantities are now great enough for it to be worth while to spend large sums in developing new tools.

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Horace M. Swetland, President
W. I. Ralph, Vice-President E. M. Corey, Treasurer
A. B. Swetland, Secretary
T. B. Van Alstyne, Advertising Manager
231-241 West 39th Street, New York City

EDITORIAL
David Beecroft, Directing Editor
Donald McLeod Lay A. Ludlow Clayden
J. Edward Schipper Sydney Oxberry
L. V. Spencer, Special Representative, Detroit

BRANCH OFFICES
Chicago—910 South Michigan Ave., Phone Harrison 7707
Detroit—95 Fort Street, West, Phone Main 1351
Cleveland—516-517 Swetland Bldg., Phone Prospect 167

Cable Address ---------- Autoland, New York
Long Distance Telephone ---------- 2046 Bryant, New York

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The British Import Duty

GREAT BRITAIN has imposed an import duty of 33 1/3 per cent on automobiles and parts with a view to producing revenue and also protecting the British automobile manufacturers. It cannot be questioned that the revenue is assured, but the efficacy of the protection is to be doubted. The enormous success of American automobiles throughout the British Empire is due to their quality and to the manufacturing methods which enable them to be produced so cheaply. Unless the British makers revise their methods of manufacture the duty will not be of greater assistance to them, in their home country, than it has been in the past in the British colonies. In Canada, Australia, New Zealand and South Africa the American car is supreme despite a high import duty which the British maker has not got against him in these countries. Why, therefore, should it help him particularly at home?

The American automobile industry has never made a great effort to secure British business; it has rather taken the orders that are brought to it and it often allows its British agents to add extravagant profits. The effect of the British duty is more likely to lead American manufacturers to study the valuable British field more closely than it is to act against them. Nothing stimulates the American manufacturer so much as obstacles to be overcome in the development of trade.

Eliminating Waste Metal

EVERY pound of metal or wood in an automobile that is not working is as useless to the owner as the mud that collects inside the fenders. And it is worse than that for it cannot be washed off, and it costs money to carry about from place to place.

It is only because there have been so many other wonderfully interesting things to develop and discover that automobile engineers have so long neglected the weight question, but the neglect has had an evil effect in that it has blinded the eyes of most of us to its absurdity. There are still plenty of engineers who will say with conviction that a comfortable car must be a heavy car. Such an opinion is due to lack of thought and lack of experience with light machines.

In THE AUTOMOBILE for Aug. 5 the possibilities of weight saving by use of light metals was considered and in this issue there is an account of another method for obtaining lightness through the design of all parts primarily from the weight viewpoint. It is by a combination of both systems that the automobile of the future will be developed in which the waste material will be no more than a man could carry.

A Chicago Section

CHICAGO has been chosen as the home of a new section of the Society of Automobile Engineers. Far greater possibilities than the grouping together of the members of the society located in this section of the country may be expected from the organization of this new branch. Chicago is the meeting place of the great agricultural section of the West, the great manufacturing industry of the central states and the most important market place of the continent. It is the greatest educational section west of New York. It is the gateway to the Great Lakes and in the heart of giant industries of every description.

An industry of as varied a nature as the manufacture of automobiles cannot fail to draw inspiration from the environment surrounding the new section. The Chicago I-will spirit is bound to permeate the atmosphere of its meetings and reflect itself in the work of the new organization. The sections are the roots of the society and the new offshoot from the parent organization could not have struck richer soil than the metropolis of the middle West. New thoughts, new ideas and a rich field of endeavor cannot fail to have their influence on the work of the society.

Here is the connecting link between the manufacturer and the consumer. Instead of intimate conversation of manufacturer with manufacturer it can readily be conceived that discussion of subjects of a broader interest will find their way into the proceedings of the new body. The people of the Chicago territory are eagerly following the progress of the automobile industry. The annual exhibitions bring to the city thousands of the natives of other states, and it is indeed fit that this great center has been selected as another center for S. A. E. activity.

Britain Taxes Ceylon Rubber

2⅜ Cents a Lb. Charged on Shipments from London—Will Stabilize Prices

NEW YORK CITY, Oct. 6—Rubber from Ceylon and exported by England has been taxed 2⅜ cents a pound by Great Britain, thus adding about $500,000 yearly to the cost to rubber importers in this country. This export has been added for revenue purposes. The United States from Jan. 1 to Aug. 16 imported from Ceylon 8,567,536 lb. of rubber. Last month, the imports ran up to 1,726,000 lb. At this rate imports amount yearly to about 20,000,000 lb. As the United States is the second largest user of this rubber and as about 95 per cent of the tire companies are using it, it is expected that prices will be more stabilized. It is expected that rubber from the other Eastern States will also receive a tax.

The United States in normal times consumes 50 per cent of the world's production of rubber, and since the war its consumption has grown to about 60 per cent of the total supply.

It is doubtful whether the imposition of the tax will turn American buyers from the British supply to the Brazilian, as it is stated that the Ceylon rubber is 25 per cent richer than the Para product because of loss in washing. And then again, the material derived from cultivated plantations in the East, where modern facilities for gathering are established, is superior in condition to the Brazilian output gathered by natives. The Ceylon rubber is cleaned, milled and dried upon purchase and is ready for manufacturing, whereas South American Para requires from one to two months to be made ready for the mills. This means that firms patronizing Brazilian agents must have capital tied up for a longer period, must employ extra labor and must increase their mill capacity. At the present time there is a drought in the northern part of Brazil.

—

Plan Automobile Reserve Corps

NEW YORK CITY, Oct. 5—The organization of an Automobile Reserve Corps is being effected in this city following the publication in *Motor Print* of an article by Secretary of War Garrison approving of the idea.

Among the officers of the National Guard in New York City who are leading in the movement are Major General John F. O'Ryan and Captain Lorillard Spencer, the latter a member of the Metropolitan Section of the S. A. E. The Automobile Club of America has given its indorsement.

It is likely that within the next two weeks a mass meeting of motorists will be held in one of the largest armories in the city, at which military authorities and well known motorists will be asked to speak.

Governor Phillips Lee Goldsborough of Maryland, announced to-day in a statement that he heartily approves of the organization of the Automobile Reserve Corps in each State and trusts that it will be successfully carried out. This will mean the establishment of a corps in Maryland as the Governor is commander-in-chief of the militia.

Anyone interested in the movement should address G. T. Bindbeutel, 239 West Thirty-ninth Street, New York City.

—

Olwell Resigns from Chalmers

DETROIT, MICH., Oct. 5—Lee Olwell, vice-president of the Chalmers Motor Car Co., has resigned, his resignation to take effect Nov. 1. Mr. Olwell came to Detroit in March, 1914, from Dayton, Ohio, where for three years he had been advertising director of the National Cash Register Co.

—

Maxwell May Pay Back Dividends

NEW YORK CITY, Oct. 6—The plan for the wiping out of the 16 per cent back dividends on Maxwell first preferred stock is expected to be announced in the near future. The method to be adopted will probably be an issue of warrants convertible into the first preferred at par for the amount of accumulated payments. As this issue is now on the 7 per cent dividend basis, the putting into operation of the plan would leave the way open for disbursements on the second preferred, as earnings on the $10,000,000 outstanding were equal to more than 14 per cent.

The annual meeting of Maxwell stockholders will be held Oct. 19 in Wilmington, Del., for the election of directors, etc.

—

Detroit Co. to Build Tractors

DETROIT, MICH., Oct. 5—Several men prominent in the automobile industry in this city are interested in the Standard Detroit Tractor Co., which has been incorporated and has a capital stock of $100,000. Its object is to make motor tractors. The incorporators are M. L. Pulcher, vice-president and general manager of the Federal Motor Truck Co., who will be president of the tractor company; Edward P. Gemmer, president of the Gemmer Mfg. Co. and Frank G. Jacobs.

—

Coghlan Klaxon Sales Manager

NEWARK, N. J., Oct. 2—Walter P. Coghlan, formerly in charge of Klaxon sales in the Northwest, takes the place of W. O. Turner as sales manager of Lovell-McConnell Manufacturing Co.

Plan Chicago S. A. E. Section

Project to Be Pushed at October Meeting of Standards Committee at C. A. C.

NEW YORK CITY, Oct. 4—Advantage will be taken of the meeting of the Standards Committee of the Society of Automobile Engineers to push the business of founding a Chicago Section of the society. This is a matter which for the last year has been under consideration by the council and at the last June session of the society, President Van Dervoort mentioned the October meeting of the Standards Committee as a suitable time for carrying it out. At that time, President Van Dervoort stated that he had written a letter to more than 150 members of the society who resided in the Chicago territory and had received a large percentage of favorable replies. It is therefore quite certain that during the month the new section will be organized.

The society officers think that it is fitting that a section of the society be organized in Chicago due to the varied interests which are centered about the metropolis of the Middle West. While the membership in the society may not be as great in the Chicago territory as it is in some other parts of the country, it is certainly a territory in which the membership should grow. Nothing will have the effect of stimulating this growth as much as the foundation of a section where interesting meetings are held frequently.

At the present time in the Chicago territory there are 101 concerns who have representation by 136 members in the society. In addition to these, there are a large number of other members who are attached to concerns not in the territory. The grand total of possible members to draw upon is somewhat over 150. Greater Chicago includes a territory in which a large percentage of manufacturers are engaged in some line of business which could be benefited by membership in the S. A. E.

—

627 Overlands in One Day

TOLEDO, OHIO, Oct. 5—A new shipping record was established by the Willys-Overland Co. on Sept. 29 when 627 cars left the factory. In the four days from Sept. 27 to 30 inclusive 2233 cars left the plant.

From April 21, when the shipments of new models first began to leave the factory up to Sept. 30, the company had shipped 49,977 cars, an increase of 133 per cent over the 21,426 shipped in the same period last year

Build 1800 Gasoline Cars Daily

Present Total Output of 16 Detroit Factories—Ford Credited with 500

DETROIT, MICH., Oct. 5—The daily output of automobiles from the sixteen active producers in this city is now running approximately 1800 gasoline machines. This total is reached after getting close approximations from each maker, and includes a 500-car schedule for the Ford company. That is, only the proportion of the total daily Ford production throughout the country that is actually assembled here is included. If the total included the number of Fords assembled daily in the various assembling plants it would be close to 2000 cars, bringing the Detroit total, on that basis, to 3300. This would be logical, because all parts of Ford cars are made here, even when assembled elsewhere.

There are several makers in this list with outputs well over 100 cars a day, and three with totals over 200. Attention should be called to the fact, in connection with these figures, that they are conservative. The amount credited to each maker was not an extraordinary day's output, but the average of several days recently.

Production would be considerably greater if makers were not all handicapped for lack of materials. Many of the makers are being held up for certain raw materials, and aluminum seems to be a big offender. The situation is causing much worry among makers generally, not only the car producers but the parts people as well.

—

Williams Returns to Overland Plant

TOLEDO, OHIO, Oct. 2—Ralph T. Williams, well known in the automobile trade, has returned from his work with Willys-Overland, Ltd., of London, England, to take the place made vacant by the resignation of Juan T. Yrigoyen, assistant manager of the foreign department at the Willys-Overland Co.'s factory at Toledo.

—

Ansted Lexington-Howard Manager

CONNERSVILLE, IND., Oct. 5—Frank B. Ansted has been named vice-president and general manager of the Lexington-Howard Co. Mr. Ansted is the son of E. W. Ansted, president of the Lexington Co.

—

Dodge Houk Sales Manager

BUFFALO, N. Y., Oct. 2—R. D. Dodge, formerly Pacific Coast manager for the Olds Motor Works, has been appointed sales manager of the Houk Mfg. Co., this city. F. W. Kyte, former sales manager, has been made assistant general manager.

George W. Houk was elected president at the annual meeting; Ed. McMaster Mills, vice-president; Ira Gleason, director; C. A. Kane, director; and F. H. Moody, treasurer.

—

Cannot Fix Uniform Time for Announcing New Models

NEW YORK CITY, Oct. 6—At the regular meeting of the board of directors of the National Automobile Chamber of Commerce, Inc., held here to-day, the committee on a uniform time for announcing new models reported that it had been unable to come to any definite conclusion and that in view of the numerous variable factors involved it could not see how a definite time could be set for this. If new models were announced Sept. 1 many factories which had cleaned up their year's business in May would be idle for three months; this would also affect the closed-car market; if Jan. 1 were chosen the fall trade would be hurt, especially that in closed cars which is rapidly growing; if May 1 were adopted the entire selling season would be affected.

The directors consider the British tax on American cars discriminatory, it being felt that if this tax were for revenue it might be ineffective because virtually prohibitive. The directors agree with the action of the English dealers who have voted and recommended that the tax be not more than 15 per cent.

—

No Increase in Hupp Price

DETROIT, MICH., Sept. 29—President J. Walter Drake of the Hupp Motor Car Co. has announced that there will be no increase in the price of the 1916 Hupmobile models, notwithstanding the increased cost of raw material or other causes. The Hupp company is now over 2500 cars behind orders.

—

Merinbaum Joins Sun Co.

BUFFALO, N. Y., Oct. 4—S. A. Merinbaum, who has been identified with the Haynes Automobile Co., Kokomo, Ind., for a number of years, first in the capacity of advertising manager and later as sales promotion manager, arrived in Buffalo this morning and took up his new duties with the Sun Motor Car Co.

—

Lott Is Chalmers Secretary

DETROIT, MICH., Oct. 4—Charles F. Lott, who has been private secretary to Hugh Chalmers, president of the Chalmers Motor Co. has been appointed secretary of that company. This function had been performed by C. A. Pfeffer, vice-president and assistant general manager.

Standards Meeting Oct. 14

Dates of Section Meetings—S. A. E. Members Invited to E. V. A. A. Convention

NEW YORK CITY, Oct. 5—Thursday, Oct. 14, will be devoted to standards work by the Standards Committee of the Society of Automobile Engineers, who on that day will hold their meeting at the Chicago Automobile Club, 321 Plymouth Court, Chicago.

Through the hospitality of the C. A. C. the members of the Standards Committee have secured a convenient location for their meeting. The club is but a few doors from the Jackson Boulevard and is surrounded by ample hotel accommodations. The purpose of the meeting is to consider reports of some of the standard divisions and new matters which may be brought to the attention of the committee. Some of the divisions have already held recent meetings to prepare reports for presentation at this October meeting. Meetings of the Iron and Steel, Miscellaneous, Springs, Research and Engine and Transmission divisions are scheduled to be held in Chicago on Oct. 13 or elsewhere before that date.

It is expected that those divisions which do not have final reports to present will make reports of progress on the various matters pending. With the establishment of an office and permanent headquarters in Detroit, the affairs of the Standards Committee have progressed even more effectively than in the past and it is expected that the meeting in Chicago will be replete with interesting new data for presentation to the Society at its annual meeting to be held in January.

Some of the subjects which will come up in Chicago at the October meeting, are: Cone clutch housings; headlight glare; standard wire specifications for electrical equipment of gasoline automobiles; lock washers for small machine screws; license plates; piston ring grooves; location of engine and chassis numbers; standard weight of cars; screws for cowl-board mountings; water hose and clamps; spring clip length, opening, etc.; standard inspection methods of physical tests for leaf springs; solid motor vehicle tires smaller than 36 in., and industrial truck standards.

Dates of Section Meetings

October meetings for the Detroit, Indiana and Metropolitan sections will be held Oct. 12 at 8 p. m. in the Convention Hall of the Hotel Pontchartrain, Detroit. K. W. Zimmerscheid, metallurgist of the General Motors Co., will present a paper

on the influence of metallurgy on design.

The Indiana section meeting will be held on Oct. 29, at 8 p. m. at the Claypool Hotel where Charles S. Crawford, Cole Motor Car Co., will present a paper on the characteristics of the eight-cylinder motor.

The Metropolitan section meeting will be held Oct. 21 at 8.30 p. m. at the Automobile Club of America, New York City. The evening will be devoted to metallurgical subjects. There will be an exhibition of motion pictures by the National Tube Co., showing the manufacture of steel tubing from the mine to the finished tube. There will also be a short talk on metallography by Prof. William Campbell.

The E. V. A. A. Meeting

The Electric Vehicle Association of America has extended to the members of the S. A. E. an invitation to attend its convention in Cleveland Oct. 18 and 19. An interesting program has been arranged and a tentative list of the papers includes the following:

Industrial Trucks in the Service of the Pennsylvania Railroad Co., by T. V. Buckwalter; The Electric Taxicab, by I. S. Scrimger; The Edison Battery Service System, by W. M. Thayer; The Function of the Electric Garage, by R. Macrae; Comparative Development of General Power and Commercial Electric Vehicle Loads and Function of Power Salesmen as Electric Vehicle Solicitors, by H. H. Holding; Problems We Are Facing and How They May Be Met, by George H. Kelly; Field for the Small Electric Delivery Vehicle, by Charles A. Ward; Electric Vehicles in Municipal Service, by Arthur J. Slade and R. Duval Dumont; and the Comparative Operation of Electric and Gasoline Machines in the Same Service, by W. J. Miller in collaboration with T. D. Pratt.

—

Show Space Drawings Oct. 7

NEW YORK CITY, Oct. 4—A very large attendance of the members of the National Automobile Chamber of Commerce is expected in this city Thursday, when the drawing for show spaces at the New York and Chicago shows will take place at the association headquarters, 7 East Forty-second Street. Applications for space by passenger car makers are as great as in former years and it is expected that all available space in the Grand Central Palace, in New York, and at the Coliseum, in Chicago, will be taken up. The distribution of accessory space will be decided later, and will be handled as formerly by the Motor and Accessories Manufacturers' Association. The order of drawing space by car makers will be according to production during the previous season, this plan having been followed for several years.

Astor Cup Race for Oct. 9

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Postponement of Opening Race at Sheepshead Speedway May Help Late Entries

NEW YORK CITY, Oct. 2—The 350-mile race for the Astor Cup on the Sheepshead Bay 2-mile board speedway, which was scheduled to start at 12 o'clock to-day was postponed at 8 o'clock this morning because of rain. It started raining in New York and vicinity yesterday morning and has rained constantly ever since, the storm being a part of the tropical hurricane that devastated the Southern States. The race will take place on Saturday, Oct. 9, starting at 12 o'clock noon, postponement of a week being necessary for various reasons; first the grounds, which were practically covered with water, would not be sufficiently dried for a race on Monday; and second, several hundred of the help required in conducting the meet could not be obtained except on a Saturday.

Much disappointment was expressed by out-of-town guests at the postponement of a week, many of these coming from places as far distant as Omaha, Atlanta, and St. Louis, having to return home without seeing the race. A canvass of the New York hotels showed over 20,000 out-of-town guests registered, all of these being classed as speedway attendants.

May Swell Starting List

What the result of the postponement will mean cannot be gaged at this time, as many who intended to be present cannot. The effect of the postponement on the number of cars starting may mean the addition of one or two that were not ready but were to have taken their elimination trials early Saturday morning before the race. These cars have not yet taken their trials, but will take them on Thursday, Oct. 7. Fortunately there are no other racing events scheduled so no inconvenience will be caused to the drivers.

De Palma to Drive Stutz

Ralph De Palma will drive a Stutz car at the Speedway Saturday, the motor on his Mercedes being so badly damaged as to make repairing impossible. He will drive the Stutz which Rooney had been originally scheduled to pilot. It is possible that Ralph Mulford may drive the Peugeot car which is a duplicate of Resta's and which is expected to arrive from France the end of this week. Some doubt was expressed concerning whether Barney Oldfield would be able to drive on Oct. 9. This has now been settled and Oldfield has been able to cancel a date in Illinois and will drive his Delage.

The sale of seats for to-day's race exceeded $80,000 and it was expected that if fine weather had prevailed yesterday and to-day that over 125,000 spectators would have attended.

The complete list of starters with their official numbers follows:

NO.	CAR	DRIVER
1.	Peugeot	Resta
2.	Peugeot	Aitken
3.	Delage	Oldfield
4.	Peugeot	Burman
5.	Stutz	Anderson
6.	Peugeot	Wilcox
7.	Stutz	Rooney
8.	Stutz	Cooper
9.	Duesenberg	O'Donnell
10.	Maxwell	Rickenbacher
11.	Mulford Special	Vail
12.	Pugh Special	LeCain
14.	Sebring	Haibe
15.	Duesenberg	Haupt
16.	Duesbenberg	Henderson
17.	Maxwell	Mulford
18.	Peugeot	Hughes
19.	Delage	Limberg
20.	Mercedes	DePalma
21.	F. R. P.	Poporato
22.	Ogren	Alley
23.	Erwin Special	G. Bergdoll

It is not yet certain whether all of the twenty-two will be starters, as some of them have yet to show whether they can make the requisite speed of 85 m.p.h. for a lap of the track.

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Denby Adds 3-4-Ton Truck

DETROIT, MICH., Oct. 4—In addition to its 1-, 1½- and 2-ton models, the Denby Motor Truck Co. now has placed on the market a ¾-ton truck which sells at $890 with open express body. With panel body there is an additional charge of $90 and with open express body but with top, $60.

This light truck has been made to meet the growing demand from department stores, bakeries, meat markets, groceries, and many other merchants having use for a rather small truck which does not have to carry more than 1000 to 1500 lb. It is also a model truck greatly in demand in small towns.

The new Denby is called type U and has a wheelbase of 119 in. Its motor is a four-cylinder block 3⅛ by 4½. Solid tires are furnished, 34 by 3 front and 34 by 3½ rear. The standard color is blue for the body and red for the chassis. In general construction the truck is similar to the other Denby models. Electric starting and lighting will be furnished at an additional cost of $85.

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Eckhart, Auburn Founder, Dies

AUBURN, IND., Oct. 1—Charles Eckhart, 74 years of age, automobile and buggy manufacturer, philanthropist and at one time candidate for governor of Indiana on the Prohibition ticket, died here yesterday following a long illness. He was the founder and president of the Eckhart Carriage Co. and the Auburn Automobile Co., although his son, Morris Eckhart, was in active charge of both businesses.

Car Sales Gain 50% in Canada

7000 More Cars Sold in Ontario Alone Than During Year of 1914

DETROIT, MICH., Oct. 2—Louis Logie, district manager for Canada for the Chalmers Motor Co., reports after an extensive investigation of conditions in Canada, that the sales of automobiles have been about 50 per cent greater thus far this year than in 1914, and that in the province of Ontario, where most of the Canadian automobile manufacturing plants are located, 7000 more cars have been sold thus far this year than up to that time in 1914. The condition is the more remarkable when it is considered that war taxes have been a big drain upon the people while on imported cars the duty is now 42 per cent.

Elkhart Four at $775

ELKHART, IND., Oct. 5—The Elkhart Carriage & Harness Mfg. Co., is bringing out a new low-priced model to sell at $775 as a five-passenger touring car. The specifications include a unit power plant having an L-head 3½ by 5 four-cylinder motor with separate head, vacuum fuel feed with tank in rear, three-speed gearset, Raybestos-faced cone clutch, floating axle, three-quarter elliptic rear springs, wheelbase 114 in. The body is an advanced streamline effect with high sides. Equipment includes electric starting and lighting system, one-man type top, quick attachable curtains and demountable rim with one extra.

Holland Leaves Anderson Electric

SEATTLE, WASH., Oct. 1—Walter E. Holland has resigned his position as research engineer of the Anderson Electric Car Co., Detroit, to become a firm member of the Broadway Automobile Co., Inc., of Seattle, Wash., agents in the Northwest for Detroit electric passenger cars, Walker electric trucks, Elwell-Parker industrial trucks and Philadelphia storage batteries. Mr. Holland will be secretary and treasurer of the Broadway Automobile Co.

Woods Returns to England

NEW YORK CITY, Oct. 4—G. Hubert Woods, representative of the British Westinghouse Electric Mfg. Co., Ltd., who has been at the Westinghouse factories in this country studying the electric starting and lighting systems as applied to American cars, sails this week for England where he will resume his duties as manager of the automobile department of this company. Mr. Woods believes that after the war the electric starter and generator will be as definite component parts of the gasoline engines in Europe as they are in America. Up to the present many British concerns have not mounted these electric units as standard component parts but have listed them as extras.

Mr. Woods is of the opinion that the question of price reduction will sooner or later take a slight change in America and that more attention will be given to car quality, which may mean a slight increase in price.

Tread Committee Report Expected

NEW YORK CITY, Oct. 4—At the regular meeting of the National Automobile Chamber of Commerce, Inc., to be held at this city Oct. 7, it is expected that the committee on automobile treads will report. This committee met in Detroit last week and has its recommendations ready. The manufacturers will continue to produce cars with 56 in. tread as standard, which naturally means that the 60 in. tread is being dropped. The chamber made a broad canvass of dealers through the Southern States and discovered that sentiment was strongly in favor of the standard 56 in. tread. With these dealers the difficulty with the 60 in. tread has been in getting deliveries. The factories have pushed the standard tread orders through as they have represented nearly 100 per cent of production and dealers with orders for 60 in. treads generally had to wait.

It was found in a canvass of road conditions in the South that only in two sections is it difficult to use the 56 in. tread, these being Southern Georgia and Northern Florida, which are bad road sections.

1916 Sphinx for $640

YORK, PA., Oct. 5—For 1916 the Sphinx Motor Car Co., this city, continues its five-passenger touring car with minor refinements at $640, or $55 less than for 1915 and also sells the same chassis for $600 and, with commercial body, for $675.

The new car uses a 3¼ by 5 block L-head motor instead of 3⅜ by 5, developing 28 hp., has Connecticut ignition system and the body has been lengthened and made slightly narrower, while its appearance is lower, the clearance being 9 in., as compared with 10½ for 1915. DuPont Fabrikoid upholstery and Raybestos brake lining are used. Wheelbase remains unchanged at 112 in. and the tires at 30 by 3½.

Mooney with Taylor-Critchfield-Clague

DETROIT, MICH., Oct. 4—Frank J. Mooney, former sales and advertising manager of the Hupp Motor Car Co. has become associated with the Taylor-Critchfield-Clague Co. advertising agents. He will specialize on automobile work.

Sheepshead to Open 1916 Season

Gets May 13 and Sept. 30 on Racing Schedule—Sixteen Dates Allotted

NEW YORK CITY, Oct. 1—The Sheepshead Bay speedway will open the 1916 American racing season. At the A. A. A. contest board meeting in this city yesterday, New York was given May 13 in the spring and Sept. 30 in the fall. This year's racing schedule is placed on a more systematic basis. With the exception of two clashing dates on July 4 at Minneapolis and Sioux City, the rest of the dates are arranged so as to fall, in a majority of cases, about two weeks apart. Sixteen dates, in all, have been allotted ten cities. Two spring races are scheduled, one at New York and the other at Indianapolis on May 30. Following these are two for June, one on the 17th at Chicago and the other at Des Moines on the 28th. Then come three races for July including the two July 4 events at Minneapolis and Sioux City and one at Omaha, July 15. Tacoma and the Elgin Road Race are scheduled during August, the first on the 5th and the latter on the 18th and 19th. Providence and Indianapolis are one day apart in the September dates, the former falling on the 16th and the latter on the 15th. Des Moines has a race scheduled for Sept. 4 and New York for Sept. 30. Omaha and Chicago will hold races on the 7th and 14th, respectively, the latter date closing the season.

Philadelphia Meet April 29?

There is a possibility that the Philadelphia Motor Speedway Association will hold a meet during the latter part of April. C. L. Hower, secretary and treasurer of the association, and P. A. Shaner conferred with Chairman Kennerdell regarding the date for the event at Philadelphia. The track is near completion.

Among these present were: New York City, Everard Thompson, A. T. Herd, W. M. Grove; Chicago, D. F. Reid, Frank Foster, Chris Weihe; Indianapolis, C. G. Fisher, James Allison; Minneapolis, D. F. Wheeler; Omaha, F. J. McShane; Des Moines, Henry Gehring; Tacoma, George Dunn; Sioux City, E. Schultz, and Providence, F. H. Perkins.

The Tentative Schedule

The tentative racing schedule follows:

Philadelphia	April 29
New York City	May 13 and Sept. 30
Indianapolis	May 30 and Sept. 15
Chicago	June 17 and Oct. 14
Des Moines	June 28 and Sept. 4
Minneapolis	July 4
Sioux City	July 4
Omaha	July 15 and Oct. 7
Tacoma	Aug. 5
Providence	Sept. 16
Elgin Road Race	Aug. 18 and 19

England Imposes 33⅓% Duty

British Opinions on Efficacy Vary Widely—Appears Unlikely to Injure American Exportation Seriously

NEW YORK CITY, Oct. 4—At last, after many years of anticipation, Great Britain has imposed sundry import duties including one of 33 1/3 per cent on automobiles and automobile parts. So far Great Britain has been the best automobile customer of the United States overseas, much the best customer in fact, and lately the British demand has exceeded all former vigor. Owing to the war the British automobile trade has been utterly tied up, making cars or other things solely to government order with no output for the private consumer, and this has sent the British dealers flocking to our shores, seeking cars for private customers and also for semi-war purposes. The chancellor of the exchequer has since proposed to waive the duty on motor trucks and parts thereof used solely for industrial purposes.

Dealer's Lot Hard

The lot of the British dealer has been very hard indeed, for depending for his living upon having cars to sell and customers to buy them, he has suddenly lost almost all the former and a large share of the latter. Naturally, he has come to America to replace the British manufacturers, and a study of the news columns of THE AUTOMOBILE for the past six months will show the extremely large number of prominent British retailers who have been in Detroit seeking cars and parts of cars. In this search quite a number of British manufacturers have participated, because the unskilled labor which could assemble a car from American made parts is available in the forms of old men and youths, while the skilled labor necessary for machine shop and other manufacturing departments is entirely absorbed by government demands.

British Consumer Pays

Thus the conditions which at the moment lead to an exceptional British demand are temporary, and it seems unlikely that any duty imposed upon automobile imports will have much effect upon the volume of business done during the war. American cars are selling in England because they are the only cars that can be bought, not because they show up well in competition with the home product, which is the true situation in normal times.

The effect of the tariff can only be guessed, but it seems most probable the immediate result will be that the British consumer will have to pay a slightly higher price. Many Britishers have lately bought American cars at $1,250 who would have willingly spent $2,000 for a home-produced car had they been able to get one, and this class of consumer will not balk at an extra 33.33 per cent.

After the War

There is also to be considered the after-war period, for this will affect the American manufacturer much more than the present instant. When the British industry is freed from munition making and again turning out automobiles the question arises as to how much the duty will act against the American exporter. Herein it may be remarked that the profit secured by the British dealer has often been excessive in the past. With three main exceptions—Ford who manufactures bodies and assembles chassis in England, Overland who imports complete cars, and Studebaker who does likewise, most of the American cars going to Great Britain have been bought here by dealers for the lowest possible price and sold in England for the highest possible price. Often between the two there is a very large margin, considerably in excess of a proper trading profit. Thus the British price for American cars is not likely to be advanced by 33 1/3 per cent to the British consumer.

British Opinions Conflict

Lately *The Autocar*, the leading British automobile paper, has devoted much space to discussion of the subject, and the general consensus of opinion is that, whatever the tariff imposed, the British manufacturer is too old fashioned and too inert to grasp the opportunity offered to him by the tariff. Writing in our contemporary, J. P. Holland, a journalist well known on both sides of the Atlantic and for some time engaged in automobile journalism in America says:

"Eleven years ago I interviewed Alfred Harmsworth (Lord Northcliffe) in New York on his return from a visit to Detroit, Cleveland, and one or two other cities of the Middle West, then rapidly coming to the front as motor car producing centers. The gist of that interview, as published in the *New York Herald*, was to this effect: 'The American small car is destined to dominate the markets of the world if American manufacturers continue to progress as they have done in the past few years.'

"There is no use disguising the fact that the motor industry, that is, the manufacturers of motor cars, have not lost money by the war. On the contrary, they have been flooded with orders, and their factories have been busy night and day. The ordinary overhead charges of selling their product, salesmen's wages, and so forth, have been eliminated. And as an evidence of the profitable margin at which they have done this government work, we have had a striking object lesson in a recent lawsuit, where two middlemen disputed the question of division of commissions, and one of them was awarded the neat little sum of $75,000 as his share in the divided commission. The fact that this sub-agent claimed $250,000 came in the shape of a startling revelation to the public.

Exceptional Treatment Folly

"Under these circumstances, to ask the public to agree to any exceptional treatment of the motor industry after the war would, I claim, be the very height of folly. The mere suggestion of such a proposal would rather have the effect of instituting an inquiry as to the reasonableness of special taxation of the war profits of the motor trade.

"Whether the reasons I have briefly put forward be considered strong enough to warrant the statement that the three courses suggested, namely, prohibition of imports, high protection, or government subsidy, all are equally inadequate to meet the case, I do not know. Should they prove to be so, or, what amounts to the same thing, should the powers that be after the war decide against their adoption, the question still remains to be answered, 'What is the British motor industry going to do about it: How will it regain the position it held before the outbreak of war?'

"This brings me back to the Harmsworth interview of 1904, the fulfilment of which has been so unexpectedly hastened by the events since August, 1914. In that interview Lord Northcliffe rightly placed the responsibility for the future success of the American small car where it properly belonged—on the shoulders of the American manufacturer.

Protective Tariff Inadequate

"The first of these, namely a high protective tariff, will fall far short as an efficient means for building up a domestic industry as compared with its effect a dozen years ago in the United States. This will be readily seen when one considers the state of affairs in New York in the early years of the present century as compared with England to-day. In those days the total output of American factories barely exceeded 15,000 cars annually. The prices paid for imported cars sound fabulously high nowadays. Mercedes chassis, $11,000, Panhard, $10,000, and even a little Darracq 12-hp. heading the list of imported cars in point of numbers at the modest figure of $6,000 apiece. Under such conditions, it may

readily be seen that a high wall of protection gave the American manufacturer plenty of margin for the development of his infant industry.

"Contrast with that state of affairs the British market as it will be when peace is proclaimed. Flooded with American cars selling at prices never touched by British cars, it is doubtful whether a protective tariff which would double the cost of the imported cars would meet the difficulty. Certainly such a duty would fall far short of giving the British manufacturer anything approaching the leeway his American confrère had when French and German cars were selling in New York for three or four times their present-day value.

"It will be necessary, therefore, to seek further afield than the purely nursery methods of protection or subsidy if the British manufacturer hopes to tackle his American rival with his own weapons. And at this point I am afraid I must leave to more technical experts the task of diagnosing between British and American methods for the purpose of adopting the best of American for the future well-being of the English. There are, however, some broad features which even an inexpert like myself cannot fail to observe, and which, I am sure, would well repay the experiment of adoption."

Importance of Colonial Trade

This was of course, before the tariff had been decided upon. Another writer in the same issue of the same publication urges the importance of the Colonial trade of Great Britain, so far neglected by the British manufacturer. He says:

"Protection alone will not save the British motor industry from destruction; enterprise and scientific methods properly co-ordinated on a wide national basis must be our main weapons in the new era of industrial development.

"Unless the British manufacturer is prepared to expand an outlook hitherto essentially insular, and think in terms of an Empire market rather than of an English, Scottish, and Irish market, he might just as well abandon hope of ever making an impression upon an invader who never thinks in less than two hemispheres nor fails to organize his production accordingly.

"I greatly fear, however, that the splendid opportunity for the British motor manufacturer which, to the Imperial thinker existed yesterday, is to-day very much less of an opportunity. Yesterday Greater Britain would have offered open-armed welcome to cars from the Motherland which fitted Colonial conditions, including Colonial purses. To-day the Overseas Dominions may well be visualizing themselves as motor car manufacturing countries.

Canada a Big Producer

"Canada is a case very much in point. Canada to-day produces for her own consumption, and for the consumption of other British colonies and dependencies, probably six times more motor vehicles than we produce in this country. The Ford company's Canadian plant alone is responsible for 35,000 to 40,000 vehicles. Overland and Studebaker are two other big firms similarly operating; and it is the same with one or two tire companies. It makes no difference whether these firms are run with American or Canadian money. They are there, in the British Empire, occupying territory which the manufacturer here at home might have occupied if he had thought Imperially yesterday, instead of merely applauding a florid phrase; and if, as is most likely, any fiscal rearrangement be made, it will leave free trade within the Empire, and these Canadian companies will be inside our tariff wall.

"Where in that case is protection for the British manufacturer? Suppose no other American car makers trek across the frontier what is going to happen to the Ford, Overland and Studebaker? It is the competition of the Ford and the Overland in this country that matters most. Between them these two companies probably sell more cars than all the British manufacturers put together; and I make no doubt that, if necessary, either or both firms would manufacture right inside these islands.

Consumer the Sufferer

"I see no protection from these manufacturers that will do the British car makers the least bit of good; and even if it were otherwise, it must be a protection entirely at the expense of the consumer, and of the distributor, middleman, or agent. As a consumer, I am, not unnaturally I hope, without enthusiasm for any such protection.

"What does the request made by the British manufacturer amount to? It asks that the consumer should go without motor vehicles until after the war, and then should be prevented, if possible, from buying any except British vehicles. This request is made by manufacturers who cannot at present supply cars themselves, and do not propose to attempt to supply cars in price competition with the American vehicles later. Most of the British manufacturers are making a fairly healthy profit out of the war. Many of them are doubtless doing better than if the war had not happened. One or two have probably been saved from extinction by the war. Yet these excellent gentlemen are asking that the profits which they might have made if the war had not happened shall be saved up and handed over to them when they have finished making profits out of the war!

Agents Not Considered

"They are not concerned about the agent of whose indispensability in their scheme they used to sing, and whose service they will seek again most eagerly presently. The agent, with none except American cars to sell, should cease from selling them, shut up the shop, and find another job until wanted! The manufacturers are not concerned about the consumer, yet probably nine-tenths of the consumers have bought other cars partly or wholly for business reasons; and business reasons to-day mean, directly or indirectly, work in connection with the war—work upon which the successful prosecution of the war and the efficiency of the fighting forces depend. The manufacturers are concerned with none of these things."

Against these two, yet a third writer points out that however true the statements of the others may be, the imposition of a tariff will undoubtedly make things better for the British manufacturer. Perhaps, however, the most important utterance is to be found in the editorial columns of the issue which contains these three opinions. In it the editor—a man famous throughout the British Empire for clear thinking on automobile subjects—says:

"It is not a question whether protection in normal times is desirable or undesirable, but entirely a matter of self-preservation. If the British motor industry in common with a number of other home industries be not protected, a large portion of it will be wiped out. This fact is clearly recognized by the greatest commercial rivals of Britain, the United States; indeed, it is so obvious to them that they would regard the British as fools if they did not protect themselves.

Foreign Plants in England

"*One of the strongest arguments against protection is that if a tariff on motor cars be imposed it will merely result in foreign makers establishing factories within Britain itself.* Undoubtedly this prophecy will be realized, but obviously the moment a factory is established within British territory, it becomes a *British factory.* It may result in severe competition for certain existing British firms, and this competition may indeed be very severe and even fatal to some of them; but the nation as a whole will not suffer so *seriously*, inasmuch as the foreign factories established in our midst will in the main give employment to British workmen. On the other hand, with no tariff there will be no incentive for foreign makers to establish themselves in this country, and the natural result will be that the automobile mechanics who to-day are actually in the army, navy, or air service, or are engaged in the manufacture of munitions, will be thrown out of work, and they will not be able to get work in this country at all in many cases, and their only salvation will be emigration and the further impoverishment of the nation.

"At the same time, in all the articles we have published it has been made *plain that tariff or no tariff the British manufacturer will not conserve his industry and his interests if he does not reform his manufacturing methods and his business methods too.* This is one of those statements which at first sight look exceedingly damaging. We would be the last to contend that the British manufacturer could not and should not improve his manufacturing and commercial system, but it must be borne in mind that a very large proportion of the home makers recognize this fact as fully or even more fully than the opponents of a motor car tariff. The view the British manufacturer takes is not that he wants a tariff to enable him to carry on his business precisely as he carried it on before the war, *but it is rather that without a tariff he will be unable to carry it on at all in many cases.*"

Will British Makers Reform?

With the soundness of this summary no thinking American could disagree in general, and all who are well familiar with the British industry will recognize the truth of it. The great question is therefore, will the British manufacturer reform or will he not? If he does not his case seems to be a parlous one in the opinion of his own particular journal and if he does he will have to move mountains if he is to fight American competition on an equal basis.

Chevrolet Capital $20,000,000

200,000 Cars Planned for 1917 —Banner Buggy Owner Interested in Co.

FLINT, MICH., Sept. 29—Through the incorporation of the Chevrolet Motor Co. of Delaware, with a capital stock of $20,000,000, which will become a holding company for the Chevrolet Motor Co. of this city, the latter will at once expand its manufacturing facilities and contemplates rivaling within another year or two the Ford and Willys-Overland companies, as to output, it is said.

Chain of Assembling Plants

In another direction the Chevrolet company will follow the lead of the Ford company, by establishing a chain of assembling plants throughout the country and Canada and by using the local or parent plant principally for the making of the parts needed in the assembling plants. The Chevrolet cars will continue to be made at the main plant, but the 1917 models may be turned out principally from the assembling plants. Of the latter those in New York, Tarrytown, N. Y., and Toronto, Canada, are already in operation, manufacturing cars which they will continue to do in addition to the assembly work. The one in Oakland, Cal., is to be started soon. Still another one will be located in St. Louis, Mo., where the Chevrolet Motor Co. of St. Louis has just been organized and incorporated, the capital all paid up being $1,000,000, Russell E. Gardner, owner of the Banner Buggy Co., being strongly interested in that company. The three-story Banner plant will be turned into an automobile factory as soon as possible. It is planned to employ 500 men and to turn out 25,000 cars a year. The Oakland and St. Louis plants will do assembly work only.

While the output schedule for the Chevrolet Four-Ninety for the 1916 season calls for 60,000 cars, plans have already been laid out for 200,000 cars of this model for 1917. A new assembling plant which will employ at least 1000 men will be started at once. The plant of the Mason Motor Co. and that of the Walker-Weiss Axle Co. where motors and axles are respectively made for the Chevrolet cars, will be greatly enlarged and production will be practically doubled.

According to a statement made by general manager A. B. C. Hardy, the Chevrolet Motor Co. of Delaware will be absolutely controlled by W. C. Durant and his present associates. The rumor that a consolidation with the General Motors Co. is contemplated, is denied by Mr. Durant.

The Chevrolet Motor Co. was organized in November, 1911, in Detroit, its capital stock being $2,500,000. In September, 1912, the company absorbed the Little Motor Car Co. in Flint, and moved into its plant. Its production, which had been 550 cars in Detroit, rose to 3500 the first year here. The second year 7000 Chevrolet cars were made.

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New Rumely Farm Tractor

LAPORTE, IND., Oct. 2—The Rumely General Utility tractor is the name of a new product of the Rumely Co., this city, which has just been standardized and which is now to be manufactured for the market. The company expects the new tractor will fill a demand for a light weight machine and will sell for $725. Its weight is 5700 lb. Its wheelbase is 10 ft. and the total length is 16 ft. The drivewheel is 26 in. wide and 4 ft. 8 in. high. At the side of the big wheel is a smaller idler wheel, the same height, but narrower than the drivewheel. It is 8 in. across. The 15 hp. four-cylinder motor is block cast. All connections in gears and driving shafts are made in side tight cases and all bearings run in oil. The completion of this design gives the Rumely company two distinct types of tractors. The utility tractor is made on motor truck lines while the Oil-Pull designs in the one and two-cylinder models follow out the heavier lines of construction. There are to be two of the new types. The smaller one, which was developed first, is made to pull two plows, with 8 and 15 hp., and will sell for $725. The other will pull three plows and will be 13 and 22 hp. and will sell for $1,300.

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Porter Leaves Chase—Inness and Collard Are Promoted

SYRACUSE, N. Y., Oct. 2—J. A. Inness, formerly manager of the Chase Motor Truck Co., Philadelphia branch, succeeded F. B. Porter of the New York branch Oct. 1. Mr. Porter, who has been the New York branch manager for the past nine years, is leaving the company to take up another line of work.

C. E. Collard, formerly with the New York office of the Chase organization, succeeds Mr. Inness as Philadelphia branch manager.

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Atlanta Co. to Build Trucks

ATLANTA, GA., Oct. 1—Commercial vehicles are to be built in this city. The E. G. Willingham Lumber Co. is preparing to enter the industry upon a large scale, discontinuing its lumber interests in order to devote its attention to trucks.

A steel concrete plant, containing 2500 sq. ft. of floor space, is being erected at the corner of Stewart Avenue and Whitehall Street. The plant will be ready for occupancy by the middle of November.

P. O. Contracts Are Awarded

Ford, G.M.C., Buick, Kelly-Springfield, White and Packard Get Truck Orders

WASHINGTON, D. C., Oct. 2—Acting on bids opened several weeks ago and published in THE AUTOMOBILE at the time, Postmaster General Burleson has awarded contracts for furnishing a number of motor trucks for use in the postal service in Detroit, Philadelphia, St. Louis and Chicago. The new service in Chicago, Philadelphia and St. Louis will go into effect Nov. 15 and will supplant, in part, screen wagon, electric car, mail messenger and city delivery services. The contracts were awarded as follows:

One-half-ton capacity—Ford.

Three-quarter-ton—G. M. C., Buick and White.

One and one-half-ton—G. M. C., Packard and White.

Three-ton—Kelly-Springfield, White, and Packard.

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Chicago Section E. V. A. A. Meets

CHICAGO, ILL., Oct. 5—Fourth annual meeting of the Chicago section of the Electric Vehicle Association of America, was held at the Hotel LaSalle to-night. Reports of officers were limited to 1 min. Secretary F. E. McCall reported that the section has 125 members which is a gain of ten over last year. Thirty members joined and twenty resigned within the year. Forty-two regular meetings were held and expenses were $324.58 or $31.22 a month.

D. C. Arlington, chairman of the traffic regulation committee, told of the work of the year which included recommendations on south side boulevard lighting, starting of street cars by light signal rather than by bell when crossing boulevards, which was condemned, standing of cars in the Loop and the teaching of traffic rules to car owners.

Harry Salvet, chairman of the garage committee, created a sensation by declaring that he had visited seventeen gasoline car branches to-day, saying he was wavering between a gas and electric car. Eleven gasoline men advised him the electric makers were going out of business. One electric dealer told him not to buy of a competitor as he was going out of business and the competitor said the same of the former.

W. F. Bauer, chairman of the standards committee said his committees had recommended a certain number of cells, the method of assembly in trays and the size of rubber jars. This has been presented to President Gilchrist, who has promised to take it up with the execu-

tive committee of the Electric Vehicle Association.

Officers were elected in unanimous vote, supporting the report of D. C. Arlington, chairman of the nomination committee, as follows: George B. Foster, Commonwealth Edison Co., chairman; William F. Bauer, Edison Storage Battery Co., vice-chairman; secretary-treasurer, F. E. McCall, executive committee; W. C. McNitt, chairman membership; D. M. Simpson, chairman papers and program; Gail Reed, chairman garage committee; W. F. Bauer, chairman standards committee; A. J. Brechtel, chairman nominating committee.

Homer E. Neisz, toastmaster, introduced several speakers, among them R. Bland, president of the Associated Garages of America, and W. B. Saylor, president of the Illinois Garagemen's Association. The latter's message was that the electric garagemen should standardize his costs. W. J. McDowell, retiring chairman, was presented with a gold fob.

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Electrical Exposition Opens

NEW YORK CITY, Oct. 6—The Electrical Exposition and Motor Show of 1915 opened here to-day at the Grand Central Palace. As in the past, some of the electrical vehicle concerns take advantage of this exhibition to demonstrate their products. At the 1915 show the members of the automobile industry taking part are the Baker-Rauch & Lang interests, General Vehicle Co., Ward Motor Vehicle Co., Edison Storage Battery Co., Philadelphia Storage Battery Co. and the Electric Storage Battery Co.

The Baker exhibit will be a D. A. Baker coupé, with a thirty-six-cell Exide battery. The Rauch-Lang is a town car with forty-two cell Exide battery. The General Vehicle Co. will show two 1000-lb. wagons, one worm and the other chain-driven. The chain drive job is one of an order of nine from the Arnold Constable Co., New York City, and the worm drive is a fancy panel job for a New York millinery establishment. The Ward Motor Vehicle Co. will have an extensive exhibit including two standard Ward special delivery wagons, one with Edison and one with lead battery, a trailer for this car which sells for $90, a stripped chassis, two rectifiers, one for the Edison and one for the lead battery and in addition one of the new coupés.

New Ward Coupe

The new Ward coupé sells for $1,295 and is fitted with a four-five-passenger body in which all the passengers face forward. The body is of hammered metal streamline design. It is fitted with Goodyear special electric tires, size 33 by 4 in., and the battery equipment is a Philadelphia forty-two-cell nine plate. The mileage is guaranteed at 40 to 60. The finish is royal blue with gray upholstery.

France to Fix Price of Alcohol

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Denatured Product Becomes Gov. Monopoly Jan. 1, 1917, by Law Before Parliament

PARIS, Sept. 17—The law now before the French Parliament dealing with the monopolization of denaturized alcohol and its extended use in the automobile industry, provides that denaturized alcohol shall become a State monopoly on Jan. 1, 1917. The State will arrange for its necessary supply of alcohol from the distillers by means of contracts. The retail price of denaturized alcohol will be fixed by government decree for periods of five years, this price being determined so as approximatively to cover the purchase of raw alcohol, its storage and delivery to wholesale dealers. The denaturizer will be supplied by the State. Its cost, also the expenses in connection with the inspection of establishments allowed to use alcohol not denaturized in the ordinary way, as well as any deficit there may be by reason of the low selling selling price of denaturized alcohol, will be met out of the revenue from the taxation of alcohol for human consumption. The probabilities are that the law will be accepted by Parliament without any important changes.

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Standard Oil Gets Injunction

ATLANTIC CITY, Oct. 1—The Standard Oil Co. has received an injunction in New Jersey against certain garages which were selling a competitor's gasoline under the name of Standard Oil. The injunction forbids the use of the words Standard Oil in connection with the sale of any products not made by the Standard Oil Co.

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Old Knox Co. Stockholders' Claims on Mayo Estate

SPRINGFIELD, MASS., Oct. 2—Holders of preferred stock in the Knox Automobile Co. are endeavoring in the Supreme Court of Massachusetts to have the value of the stock made good to them from the estate of the late Alfred N. Mayo.

The plaintiffs base their suit upon the grounds that the Knox preferred stock contained a proviso that when the surplus of the company exceeded $100,000 the excess over that amount should be applied to the paying off of the preferred stock. In 1906 they claim that the surplus amounted to $466,000; but that Mr. Mayo, who dominated the company, used his influence to cause the company to break the agreement with the holders of the preferred stock. Instead of using the excess money to redeem the stock, it was used, with other money borrowed by the company, for the expansion of the plant and the enlargement of the business. When the company failed the stock became valueless. The stockholders claim that they would not have suffered this loss if it had not been for Mr. Mayo's action in inducing the company to break its agreement with them. They therefore ask the court to order the Mayo estate to make good to them this loss. Two suits have been entered by them, one in equity and one in law. The defendants demurred to both of these suits and were sustained by the Superior Court, and the petitions referred to the full bench of the Supreme Court. A decision will be reached in about a month.

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Chandler Six Completes Non-Stop Run Across U. S.

LOS ANGELES, CAL., Oct. 5—*Special Telegram*—Across the United States from Mexico to Canada without a stop of the motor or the wheels is the feat accomplished by a Chandler six. The car left Tiajuana, Mex., Sunday morning, Sept. 26, at 9 o'clock with the starting pedal and crank socket sealed with the official seal of the Panama-California Exposition. The following Friday afternoon at 1.20 o'clock the car came to a stop at the command of the Canadian customs and emigration officials at Vancouver, B. C., after it had crossed on to Canadian soil.

At the finish of the run the speedometer registered 1889.5 miles. This distance had been stretched on account of detours made at different points to avoid ferries on the scenic Pacific highway. The crew of the car snatched sleep whenever possible on the road, eating and sleeping in the car throughout the entire tour. Chandler dealers and friends along the route supplied the men in the car with food and supplies, gasoline and oil were taken on while the car was moving, by the use of a large funnel with an elbow.

The most remarkable feature of the trip and the one which saved the car from coming to a stop was the drive over the $50,000 north bank railroad bridge which crosses the Columbia River.

A. J. Davidson, superintendent of the Spokane, Portland & Seattle system, with R. C. Wegner, master mechanic of the same road, took a personal interest in the feat of the Chandler and after tieing up five railroad systems and blocking the river traffic the railroad officials rode across the bridge in the first automobile that ever traveled the entire length of the Pacific highway on its own power, the first automobile to ever cross the 3-mile railroad bridge and the first car to travel across the United States without a stop of motor or wheels.

$1,000,000 Stock for Hayes Wheel

Officers of Co. to Submit Plan for Increase from $300,000 to Stockholders

JACKSON, MICH., Oct. 1—The officers of the Hayes Wheel Co. will submit to the stockholders of the company a proposition tending to increase the capital stock from $300,000 to $1,000,000. A stock dividend of 166 per cent, or $500,000, is to be declared and the balance, or $200,000 in stock, is to be given to the owners of the property of the Pioneer Shaft & Pole Co., Anderson, Ind., which the Hayes company has just purchased. This newly acquired plant will supply timber for the manufacture of wheels. The local concern's business has been growing to such an extent that some time ago a plant was started in St. Johns, Mich., where truck wheels only will be made. Still further extensions are contemplated.

General Motors Co. Voting Trust Dissolved

NEW YORK CITY, Oct. 4—The voting trust of the General Motors Co. has been dissolved. The voting trustees were J. N. Wallace, Frederick Strauss, J. J. Storrow, W. C. Durant, and E. W. Clark, who acted under the agreement dated Oct. 1, 1910.

Sufficient funds have been deposited with the Central Trust Co. to pay the 6 per cent, five-year notes maturing Oct. 1, 1915. Holders of stock may now receive stock certificates upon presentation of their stock trust certificates at the Central Trust Co. The trust certificates must be presented prior to Oct. 26, as the books of the company close on that date, to reopen after the annual meeting, Nov. 17.

At a special meeting of the governors of the New York Stock Exchange, $14,985,200 preferred and $16,506,800 common stock was issued by the General Motors Co., in exchange for $14,583,700 voting trust certificates for preferred and $16,189,000 voting trust certificates for common stock, with authority to add $3,053,200 preferred and $3,367,200 common. This makes the total amounts of General Motors authorized to be listed $16,038,400 preferred and $19,874,000 common.

Packard's Fiscal Receipts Estimated at $16,000,000

DETROIT, MICH., Oct. 4—The gross receipts for the fiscal year to Aug. 31 of the Packard Motor Car Co., are estimated at $16,000,000, a gain of $3,000,000. This represents an increased income of 23 per cent. The company, it is stated, sold and delivered 1800 passenger cars, against sales of 2625 the year before and 2983 in 1913. In other words, the sale of cars fell off 30 per cent, but gross gained 23 per cent.

Simms May Increase Capital

NEW YORK CITY, Oct. 6—A special meeting of the stockholders of the Simms Magneto Co., East Orange, N. J., will be held at Room 1400, 25 Broad Street, this city, on Oct. 13 to consider and vote upon a proposition to amend the capital stock of the company from $1,750,000 par value, consisting of 17,500 shares of par value of $100 each of which 12,500 shares are common and 5000 preferred, to $1,855,000 par value, consisting of 12,500 common and 6050 preferred.

Few Market Changes

NEW YORK CITY, Oct. 5—Trading conditions in the markets this week were somewhat brisk, but the changes were few and small. Aluminum has again moved upward, holders asking 48 and 50 cents for spot in ton lots. Antimony is firm and receiving fair support. The asked price is quoted at 27½ and 28¼ cents for duty paid and 26¾ cents in bond. The copper market was firm at the opening of the week with the metal in large demand, sales being made to domestic consumers at 18¼ cents thirty days delivered for Electrolytic and 18 cents for Lake with the same terms. The steel markets were firm with a good general demand for the metal but there was no change in the price.

France and Italy still continue to buy all the steel-making iron that they can secure. Yesterday a new inquiry for 6000 tons of Bessemer steel came into the market for one of the allied countries, reported to be Italy. The lead market was easier last week because of a decline in the London market. All last week outside interests were asking 4.55 cents, which is 5 points over the price of the leading interest.

The oil and lubricants markets were also firm with but two changes taking place. There is a good market for all the refined products, and the demand is even better than anticipated for this season of the year. Crude oil is firm, but there have been no further advances reported.

Swinehart Earns 17%

AKRON, OHIO, Oct. 4—Directors of the Swinehart Tire & Rubber Co. have issued an annual statement showing that the company enjoyed a year of prosperity confined wholly to American trade. Gross earnings exceeded $2,000,000 and net earnings passed the $135,000 mark, which is about 17 per cent on the $800,000 capital stock.

The directors discussed a probable increase of dividends to 7 per cent Jan. 1. No definite action was taken. The regular quarterly dividend of 1½ per cent was declared.

Current assets in the statement issued show: cash $35,022; accounts and notes receivable, $258,822.58; inventories, $741,605; prepaid accounts, $12,211; real estate, buildings, machinery and tools, $319,522.84. Total, $1,417,213.97.

Liabilities are: accounts and notes payable, $400,955; accrued labor, $5,205.95; contingent liabilities, $15,432; capital stock, $800,000; surplus, $195,580.62. Total, $1,417,213.97.

Detroit Commercial Increases Capital

DETROIT, MICH., Oct. 2—The capital stock of the Detroit Commercial Car Co. has been increased from $1,000 to $100,000. This concern was recently organized to make the Detroit package delivery wagon, to sell at $690 with open express or panel body and at $745 with a more elaborate body.

Springfield Metal Body Elects

SPRINGFIELD, MASS., Oct. 1—The Springfield Metal Body Co., this city, has increased its capital stock and elected

Daily Market Reports for the Past Week

Material.	Tues.	Wed.	Thurs.	Fri.	Sat.	Mon.	Week's Changes
Aluminum	.47	.45	.45	.45	.45	.48	+.01
Antimony	.27	.27½	.27½	.27½	.27½	.27½	+.00½
Beams and Channels, 100 lb.	1.51	1.51	1.51	1.55	1.55	1.55	+.04
Bessemer Steel, ton	24.50	24.50	24.50	24.50	24.50	24.50	...
Copper, Elec., lb.	.18	.18	.18	.18	.18	.18	...
Copper, Lake, lb.	.18¼	.18¼	.18¼	.18¼	.18¼	.18¼	...
Cottonseed Oil, bbl.	6.90	6.82	6.80	6.91	6.86	7.13	+.23
Cyanide Potash, lb.	.23	.23	.23	.23	.23	.23	...
Fish Oil, Menhaden, Brown	.39	.39	.39	.42	.42	.42	+.03
Gasoline, Auto, bbl.	.16	.16	.16	.16	.16	.16	...
Lard Oil, prime	.85	.85	.85	.85	.85	.85	...
Lead, 100 lb.	4.55	4.55	4.55	4.55	4.55	4.52½	—.02½
Linseed Oil	.58	.58	.58	.58	.58	.58	...
Open Hearth Steel, ton	25.00	25.00	25.00	25.00	25.00	25.00	...
Petroleum, bbl., Kansas, crude	.80	.80	.80	.80	.80	.80	...
Petroleum, bbl., Pennsylvania, crude	1.70	1.70	1.70	1.70	1.70	1.70	...
Rapeseed Oil, refined	.77	.77	.77	.77	.77	.77	...
Rubber, Fine Up-River Para	.55	.55	.55	.55	.55	.55	...
Silk, raw, Italian	...	...	4.05	...	4.05	4.05	...
Silk, raw, Japan	...	...	3.70	...	3.70	3.75	+.05
Sulphuric Acid, 60 Baume	1.00	1.00	1.00	1.00	1.00	1.00	...
Tin, 100 lb.	33.25	33.25	32.50	32.25	32.25	32.00	—1.25
Tire Scrap	.04¾	.04¾	.04¾	.04¾	.04¾	.04¾	...

the following officers for the ensuing year: President, Walter L. Fry; first vice-president, Hinsdale Smith; second vice-president, E. McGookin, who is also sales manager, and treasurer, Arthur P. Smith. This concern has recently granted three licenses to manufacture the patented Springfield top for motor cars.

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Claims for $5,500 on Midland

MOLINE, ILL., Oct. 2—An echo of the failure of the Midland Automobile company two years ago, was heard this week when the attorneys for the petitioning creditors, filed a claim for $1,000 fees, while the receiver asked for $1,500. The attorneys engaged by the receiver put in a bill for $3,000, making a total of $5,500. The report of the receiver will be read before the referee in bankruptcy in Peoria on Oct. 18 and action will be taken upon the claims and report at the same time.

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Orders 1000 Automobile Cars

DETROIT, MICH., Oct. 1—Word was received by the traffic department of the Detroit Board of Commerce from the Michigan Central Railroad that in addition to the 500 special cars for automobiles ordered several weeks ago, the road now has placed another order for 500 more freight cars for automobiles. This is one of the first results of the Board of Commerce efforts.

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Dividends Declared

Kelly-Springfield Tire Co., New York City; quarterly of 3 per cent on common, payable Nov. 1 to stockholders of record, Oct. 15.

Securities Markets Active

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Kelly-Springfield Features Market—Anglo-French Loan Is Market Factor

NEW YORK CITY, Oct. 4—Trading is going on an enormous scale and further violent price movements were recorded in last week's securities. There were many changes which showed marked advances. Kelly-Springfield tire featured the market with an advance of 30 points. With Goodyear closing at 335 making a total gain of 25 points and Firestone closing at 560, a gain of 20 points, these tire issues this week showed the largest gains. The rest of the tire issues showed but small gains, ranging from 1 to 10 points.

The specialties markets did not show up as strong as usual, there being but a few small gains. General Motors, which for some weeks has been having a remarkable high record, made but a 4-point rise. The bidding was a little lighter in the specialties during the first part of the week but it was reported that it would again grow strong in a few days.

This seemed to stimulate the market a bit and on Friday there was a marked rise. Chalmers rose from 116 to 140, making the total gain 24 points. The rest of the market gains ranged from 1 to 10 points.

The Detroit markets were strong, the gains being heavy and many. General Motors featured the market, its closing bid being 345, a gain of 55 points. Then followed Chalmers with a gain of 18 points. Continental made a gain of 15 points and Paige a rise of 5 points. These were the main gains in the active stocks. The inactive stocks were weak, there being only two changes made, one a loss and the other a gain of ½ point.

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Goodrich May Issue Quarterly Statements

NEW YORK CITY, Oct. 4—Officials of the Goodrich Tire & Rubber Co. are considering the advisability of issuing quarterly statements in the future. It is probable that figures for the September quarter will be given out next month.

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Acme Die Casting Capital Increase

BROOKLYN, N. Y., Oct. 4—The Acme Die Casting Corp., Bush terminal, will increase its capital stock from $125,000 to $200,000. The company is at present increasing its plant.

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Taylor Puritan Machine Secretary

DETROIT, MICH., Oct. 4—Oscar R. Taylor, formerly with the Port Huron Engine & Thresher Co., Port Huron, Mich. and also with the General Motors Co., has been appointed secretary of the Puritan Machine Co. with which he has been connected for over a year.

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Sigle Sommer Production Manager

BUCYRUS, OHIO, Oct. 1—W. E. Sigle has become production manager of the Sommer Motor Co. Mr. Sigle has occupied a similar position with the Maxwell company at Dayton.

Automobile Securities Quotations on the New York and Detroit Exchanges

	1914 Bid	1914 Asked	1915 Bid	1915 Asked	Wk's Ch'ge
Ajax-Grieb Rubber Co. com			300	..	..
Ajax-Grieb Rubber Co. pfd			101	..	..
Aluminum Castings pfd			102	..	..
J. I. Case pfd			79	83	..
Chalmers Motor Co. com			140	146	+24
Chalmers Motor Co. pfd			98	102	+2
Electric Storage Battery Co			73	75	+4
Firestone Tire & Rubber Co. com			560	..	+20
Firestone Tire & Rubber Co. pfd			112	..	+1
General Motors Co. com			348	352	+24
General Motors Co. pfd			111	113	+2
B. F. Goodrich Co. com			77	79	+8
B. F. Goodrich Co. pfd			109	111	+1
Goodyear Tire & Rubber Co. com			335	345	+25
Goodyear Tire & Rubber Co. pfd			109	110	..
Gray & Davis, Inc., pfd			..	..	..
International Motor Co. com			29	30	..
International Motor Co. pfd			58	63	..
Kelly-Springfield Tire Co. com			220	227	—30
Kelly-Springfield Tire Co. 1st pfd			89	91	—1
Kelly-Springfield Tire Co. 2d pfd			225	235	—10
Paige-Detroit Motor Car Co			..	450	..
Maxwell Motor Co. com			53	55	+1
Maxwell Motor Co. 1st pfd			92	93	..
Maxwell Motor Co. 2d pfd			44	45	..
Miller Rubber Co. com			198	202	+8
Miller Rubber Co. pfd			109	110	+2
New Departure Mfg. Co. com			..	..	..
New Departure Mfg. Co. pfd			..	..	..
Packard Motor Car Co. com			126	130	+6
Packard Motor Car Co. pfd			100	..	..
Peerless Motor Car Co. com			122	130	—8
Peerless Motor Car Co. pfd			92	94	..
Regal Motor Co. pfd			..	21	..
Portage Rubber Co. com			54	56	—1
Portage Rubber Co. pfd			92	94	—1
*Reo Motor Truck Co			18	19	+1½

No quotations available at this time on account of war.

*Par value $10; all others $100 par value.

	1914 Bid	1914 Asked	1915 Bid	1915 Asked	Wk's Ch'ge
*Reo Motor Car Co			34½	..	+1¾
Splitdorf Electric Co. pfd			..	..	..
Stewart-Warner Speed. Corp. com			76	78	+2
Stewart-Warner Speed. Corp. pfd			106	..	..
Studebaker Corporation com.			140	141½	+1
Studebaker Corporation pfd			109	110	+2
Swinehart Tire & Rubber Co			87	90	+1
Texas Company			170	172	+7
U. S. Rubber Co. com			54	55½	+2
U. S. Rubber Co. pfd			106	107½	..
Vacuum Oil Co			225	230	+2
White Company pfd			110	..	..
Willys-Overland Co. com			223	225	+10
Willys-Overland Co. pfd			108	110	+1

OFFICIAL QUOTATIONS OF THE DETROIT STOCK EXCHANGE

ACTIVE STOCKS

Chalmers Motor Co. com	..	97	139	..	+18
Chalmers Motor Co. pfd	..	..	97½	102½	..
Continental Motor Co. com	155	180	295	..	+15
Continental Motor Co. pfd	..	75	83½	..	—1½
General Motors Co. com	61	..	345	355	+55
General Motors Co. pfd	81½	..	111	112½	—2
Maxwell Motor Co. com	10½	..	53	55	—4
Maxwell Motor Co. 1st pfd	28	..	90½	93	—1¼
Maxwell Motor Co. 2d pfd	..	..	44½	47	— ½
Packard Motor Car Co. com	..	..	126	..	+3
Packard Motor Car Co. pfd	..	94	100	..	..
Paige-Detroit Motor Car Co	..	..	..	445	—5
*Reo Motor Car Co	19	19½	35½	..	+3⅛
*Reo Motor Truck Co	10¼	11	18¼	19	+1⅛
Studebaker Corp. com	..	..	140	143½	+2¼
Studebaker Corp. pfd	..	..	106	110	..

INACTIVE STOCKS

*Atlas Drop Forge Co	21	..	..	29	—2
Ford Motor Co. of Canada	..	500	1500	..	..
Kelsey Wheel Co	..	..	205	..	..
*W. K. Prudden Co	..	20½	21	..	+ ½
Regal Motor Car Co. pfd	25	..	..	21	..

$1,000,000 Addition to Tire Plants

Goodrich and Goodyear to Expend That Sum for Larger Manufacturing Quarters

AKRON, OHIO, Oct. 2—Announcements are made by the Goodyear and the Goodrich companies that additions to their plants to be started in the near future will mean an expenditure of more than $1,000,000.

The B. F. Goodrich Co. is excavating on Bartges Street for a five-story building 800 by 270 ft., which will be the largest of any of the structures in the plant. A six-story building is also being erected on Falor Street, on the site of the employment office. The structures on Bartges Street will cost in the neighborhood of $800,000.

The Goodyear Tire & Rubber Co. will erect an eight-story building 200 ft. wide to its present uncompleted addition on East Market Street.

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Empire Acquires New Plant

INDIANAPOLIS, IND., Oct. 2—The Empire Automobile Co. has acquired a new plant in this city. The factory affords a manufacturing floorspace of approximately 150,000 sq. ft. in three combined buildings. The entire Empire production will be carried on in the Indianapolis plant after Jan. 1, the acquisition of this plant centralizing all the interests of the company. Heretofore the general offices have been maintained in Indianapolis while the manufacture of cars was carried on at Connersville. The general sales and executive offices are now located at the factory.

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Paige Breaks Production Records

DETROIT, MICH., Sept. 28—Production at the Paige-Detroit Motor Car Co. is now averaging 150 cars a day. Shipments during the past two weeks were the largest in the company's history. The additions to the plant now completed provide over 100,000 sq. ft. additional floorspace. When all additions are completed, all the new machinery installed and an increased working force added, production will permit the finishing of 250 cars or more per day.

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Knox Motors Co. Refuses to Sell Plant

SPRINGFIELD, MASS., Oct. 5—Overtures have been made to purchase the plant of the Knox Motors Co., by one of the big organizations manufacturing war munitions. The officials of the Knox company admit that offers were made, but state they will not sell the plant. Three companies were bidding for it, the Bethlehem Steel Co., the New England Westinghouse Co. and the General Electric Co. The New England Westinghouse Co. has purchased the Stevens-Duryea plant in this city. As officials of that company are here now an effort was made to get some inkling from them. Vice-president L. A. Osborne of the company stated that they were not after the Knox plant. The Knox company is understood to have filled some of its large war orders for tractors for the past few months as sub-contracts for the Bethlehem Steel Co. so an intimate line has been established between the two companies.

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Briscoe To Build Plant

JACKSON, MICH., Oct. 1—After several months of negotiations between the Briscoe Motor Co. and the Chamber of Commerce, it was announced to-day that as a result, the Briscoe company will build a new plant on Wildwood Avenue which is to cost no less than $100,000 and where possibly more than 5000 men will be employed.

One of the principal conditions for the realization of the expansion plan was that something would have to be done by the city or the citizens to provide at least 200 lots for the erection of workingmen's homes. An organization known as the Billancourt Land Co. was effected and it owns now 130 acres of land on Wildwood Avenue. Two hundred lots are to be offered for sale at $300, payable $50 down and $50 per month. The City Bank, People's Bank, Union Bank and the State Savings Bank are co-operating and will provide loans, with which the new Briscoe plant will be erected. The automobile company will lease the factory and site of about 15 acres for a period of ten years at $10,000 a year, it is said, with privilege of purchase at liberal terms.

The expansion of the Briscoe plant will also mean an extension of the Argo and other concerns in which Benjamin Briscoe and his associates are strongly interested.

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Frost Gear & Forge Adds

JACKSON, MICH., Sept. 28—An addition to the plant and equipment of the Frost Gear & Forge Co. will increase the production capacity of the concern at least one-third. The addition consists of a structure 42 by 132 ft. and when completed the plant will increase its working force of 350 to at least 450. Night shifts are being worked in both the gear cutting and drop forge departments. Orders on the books now will keep the plant working to full capacity for a year and exceed any previous year's business of the company.

Studebaker Plant to Expand

Acquires Additional Property —Co. Plans to Build 75,000 Cars for 1916

DETROIT, MICH., Sept. 30—The Studebaker Corp. has acquired a large property which adjoins its plant No. 3, and will begin at once the erection of additions to that plant. Other additions to be put up in this city consist of a three-story extension to plant No. 5, a new drop forge shop, 62 by 264 ft. and an addition 62 by 140 ft. to the blacksmithing shop, both of steel, glass and tile, to building No. 25. The old De Luxe plant, which is part of plant No. 3, will be torn down and a four-story building 52 by 326 will be erected to be used for machining work. An extension, 35 by 120 ft., will be made to the power house and the freight shipping platforms of plant No. 3 will be rearranged and extended.

These additions to plant No. 3 will probably be followed by others to other local Studebaker plants. Originally the corporation planned to make 60,000 cars for the season 1916, but according to vice-president L. J. Ollier, 75,000 cars have been contracted for.

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Champion Spark Plug Co. Increases Production to 50,000

TOLEDO, OHIO, Oct. 1—An increase in production from 35,000 to over 50,000 spark plugs per day is reported by the Champion Spark Plug Co., this city. This concern recently has been forced to enlarge its factory facilities by the addition of over forty new automatic machines. There has been a proportionate increase in other equipment of the factory.

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Hardwood Men to Boycott Metal Bodies —Boost Wood

MILWAUKEE, WIS., Oct. 2—The propaganda instituted by the hardwood lumber manufacturers of the north, centered in Wisconsin, to induce automobile manufacturers to return to the use of wood bodies instead of sheet metal, contemplates a carefully detailed campaign which is to bear fruit in 1917 and succeeding years. It will be principally an educational campaign, but the lumbermen will use direct means of forcing the issue by gathering their cohorts into an army that will refuse to purchase cars unless the bodies are of wood construction.

H. E. Christiansen, a well known hardwood lumber dealer of Milwaukee, who is taking a leading part in the movement says: "It is a fact that in 1910 and

1911 one motor car builder alone was using lumber at the rate of 20,000,000 ft. a year. In 1915 the same manufacturer is using only 2,000,000 ft. The profit is at least $2 per thousand, so we can see that $36,000 has been lost to the lumber trade in one instance alone."

Every lumberman who purchases a car in the future is to make a particularly strong effort to have his machine equipped with a wood body, according to the plans of the hardwood manufacturers. It is admitted that such procedure will be difficult for 1916, but by 1917 the propaganda is expected to have made sufficient headway to count.

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Goodyear Passes $2,000,000 Mark

AKRON, OHIO, Oct. 4—The annual sales conference of the Goodyear Tire & Rubber Co. was brought to a close last Wednesday, district and branch managers from all over the country having been the guests of the company for a week. The company's record during the past year was reviewed and sales plans laid for the forthcoming season. It was brought out that this has been the Goodyear company's greatest business year, among other things the $2,000,000 mark set for the automobile tire department a year ago having been reached and passed, and it is confidently expected that 1916 will be a still greater year.

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Electric Brush Co. Formed

DOVER, N. J., Oct. 4—The Electric Brush Co. has been formed here with the purpose of producing brush parts for all makes of electrical apparatus used on automobiles. The company plans to carry in stock at all times brush parts which will fit all sizes and types of lighting generators and starting motors, magnetos, etc., produced by all of the various companies.

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General Electric Men Strike

SCHENECTADY, N. Y., Oct. 4—Ten thousand employees at the local plant of the General Electric Co. went out on a strike to-day in their fight for an 8-hr. day, and the remaining 3000, comprising the molders, coremakers, and blacksmiths, voted to-night not to report for work in the morning. This means tying up the entire plant with the exception of the office force.

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Market Warner Products Direct

CINCINNATI, OHIO, Oct. 4—The Warner Auto Top Co., which heretofore has marketed its upholstery and top covers through distributors, has altered its sales policy and hereafter will market its product direct to the trade. All the Warner products hereafter will be marketed under the company's own name.

140,168 Cars in Iowa

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36,000 More Than Total for 1914—Farmers Big Factors in 33% Gain

DES MOINES, IOWA, Oct. 2—Iowa now has 140,168 automobiles registered for the present year. This is an increase of 36,000 or over 33 per cent as compared with the total for 1914 and the total for the present year is expected to reach the 150,000 mark. The registration figures show the notable fact that there are relatively more cars in the rural districts than in the cities.

Using the last federal census as a basis, Iowa now has one automobile to every fifteen persons in the State. In the counties with a large urban population the percentage of car owners is lower. Polk county, in which Des Moines is located and which has the largest urban population of any county in the State, has 5550 cars which is one to every nineteen of population. Woodbury county, in which Sioux City (the second city of the State) is located has 2966 cars or one to every twenty-two of population.

Buena Vista county, with a population of 15,891 which is largely rural, has 1722 cars or one car to every nine persons. Clay county, also largely rural in population, has 1385 cars for 12,766 of population. The same situation prevails in Humboldt, Kossuth, Ida, and other counties with preponderantly rural populations.

Automobile registration fees for the State have been $1,137,500 so far this year as compared with $1,040,135 for the entire year of 1914. The following table of automobile registration fees in Iowa for the years from 1907 to 1915, inclusive, shows the remarkable growth of the automobile business in the State:

YEAR	FEES
1907	$7,202
1908	20,880
1909	36,347
1910	65,608
1911	259,736
1912	485,300
1913	600,000
1914	1,040,135
1915 (to Sept. 28)	1,137,500

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New Milwaukee Gasoline Prices Favor Quantity Consumers

MILWAUKEE, WIS., Oct. 2—A readjustment of the scale of prices on gasoline in Milwaukee and neighboring territory to the end that motorists will pay a premium over the prices made to quantity consumers, has been effected by both independent and Standard companies. For several years, or since the filling station came into vogue, motorists have been paying the same price per gallon for 5 or 10 gal. of gasoline that buyers of 100-gal. lots were charged. For example, a motorist who drove his car to the filling station, of which there are more than 100 in Milwaukee, was able to fill his tank, no matter how little he required, at the same price per gallon which was charged the garage across the way. The readjustment, together with general advances in the price of gasoline, has brought the quotation per gallon on 60 deg. gasoline to 12½ cents at filling station; 11.6 cents per gallon for tank wagon delivery, and 10.6 cents per gallon for tank wagon delivery, 100 gal. or more. From May to September, the price per gallon to individuals buying small quantities ranged from 10.5 to 10.6 cents, or the same price now quoted in lots of 100 gal. or more. The uniform quotations effective Oct. 1 are as follows:

Sp. Gr.	Filling Station, Cents	Tank Wagon Delivery, Cents	Tank Wagon 100 Gal. Delivery or More, Cents
60 degrees.....	12.5	11.6	10.6
65 degrees.....	16.5	15.5	14.5
70 degrees.....	18.5	17.5	16.5
72 degrees.....	20.5	19.5	18.5

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Gasoline Up 1 Cent

CHICAGO, ILL., Oct. 6—The price of gasoline has been raised during the last week 1 cent. In this city, the Standard Oil Co. of Indiana is quoting gasoline at 11½ cents a gallon for 10 and 50 gal. lots. In Tacoma, gasoline is retailing for 12 to 12½ cents. And in Portland, Ore., it is selling wholesale at 11 cents. For the past six months a number of stations in this city have sold gasoline at the wholesale price, 10 cents. The price went up 1 cent to-day in Denver, Col., most garages selling it at 16 and some at 20 cents.

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Gasoline Up in St. Louis

ST. LOUIS, MO., Oct. 2—The independent refiners have raised the price of gasoline 1 cent, from 11 to 12 cents per gallon. This increase in price followed closely upon an increase made by the Standard company from 9.9 to 10.9 cents.

When the price had been reduced from 17.5 cents to 8.9 cents a gallon the independents called a halt and started to boost the price with the avowed intention of bringing it back to what it was before the price-cutting war. Thus when the independents sold gasoline for 10 cents the Standard sold for 8.9. When the Standard brought its price to 9.9 the independents raised their price to 11 cents. Last Wednesday the Standard raised its price to 10.9 and the independents immediately brought theirs to 12 cents. At the same time the independents raised the price of their No. 2 from 13 to 14 cents and No. 1 from 14.5 to 15.5. They attribute these increases to the increased cost of the crude product.

Michigan Service Men to Organize

First Steps in Formation of Automobile Service Managers' Assn. of Michigan

DETROIT, MICH., Sept. 29—The first steps toward the organization of the Automobile Service Managers' Association of Michigan were taken this afternoon when under the presidency of Alfred Reeves, general manager of the National Automobile Chamber of Commerce, service managers from Detroit and other Michigan factories met at Hotel Statler.

A committee consisting of C. R. Lester, chairman, Packard; D. H. Haselton, Regal, and A. O. Weise, Oakland, was appointed to prepare by-laws and a constitution. Another meeting will be held Oct. 26, when the final organization will be effected.

One of the service managers present stated that the object of such an association is primarily to reach an understanding among all automobile manufacturers of the State as to what the service department should ultimately be; or in other words, to provide a standard service policy. There was no discussion on the subject at this first meeting except that most of those present thought that this serious question of service can be better solved or at least brought to a better and more universal policy by having an organization of those men who look after the service departments in the plants. Such an organization has just been perfected among the Indiana automobile manufacturers and will very likely be before long in the States of Ohio and New York. Quite likely there will be a national organization as a consequence.

The service managers who attended the meeting were: in addition to those already mentioned, C. W. Matheson, Dodge; E. A. Haskins, Federal; Pierre Schon, General Motors Truck Co.; R. O. Gill, Saxon; J. E. Fields, Hupp; J. L. Kenyon, Cadillac, and E. V. Rippingille, Hudson.

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Columbus Garage Convention Postponed

COLUMBUS, OHIO, Oct. 5—The State convention of garage owners which was to have been held here during the three days, Oct. 4, 5 and 6 has been postponed three weeks. The new dates selected are Oct. 25, 26 and 27.

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Detroit Salesmen Organize

DETROIT, MICH., Oct. 2—Preliminary arrangements have been made for the organization of the Detroit Salesmen's Association. A committee was appointed to prepare recommendations to be submitted at a general meeting to be held next week. Among the members of the committee are: C. C. Cunningham, director of sales, Hudson Motor Car Co.; Norvell A. Hawkins, general sales manager, Ford Motor Co.; Harry W. Ford, president, Saxon Motor Co.; H. H. Hill, sales manager, Packard Motor Car Co.; Joseph Mack, president, Mack Printing Co.; F. H. Dodge, general sales manager, Burroughs Adding Machine Co.; H. Wilbert Spence, Mutual Life Insurance Co.; D. M. Barrett, editor *Salesmanship*, and James W. Fisk, director of selling service, J. L. Hudson Co.

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Firestone Salesmen Meet

AKRON, OHIO, Oct. 4—Fully 500 salesmen, branch managers, department heads and officials of the company, attended the home coming of the Firestone Tire & Rubber Co., held here last week. Special cars were run from many parts of the country, bringing in the tire men to attend the meeting. On Sept. 29 the men were received in the executive offices of the Firestone plant and later a number of addresses on tire making and selling were made. At noon a luncheon was served in the restaurant of the company which was followed by an inspection of the plant.

An all day session of the branch managers and department heads was held Sept. 28.

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Wants to Represent Parts Makers in Coventry

COVENTRY, ENGLAND, Oct. 4—G. R. Bromley of the British Components, Bedford Street, Coventry, is looking for several agencies, such as the representation of automobile parts makers, also firms that can supply forgings and stampings of all descriptions and nickel crankshafts. Mr. Bromley is also interested in taking up the sole agencies with anything connected with the engineering, motor and machinery trade.

Mr. Bromley has been in the automobile trade since 1899, having been connected with the Daimler Motor Co. for several years and for two and one-half years with J. L. Lambie of the Bedford Motor Co. or the General Motors, Ltd., Long Acre, London, W. C., as chief outside representative.

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Accessory Jobbers Meet Oct. 20-22

KANSAS CITY, MO., Oct. 4—The National Association of Automobile Accessory Jobbers, whose headquarters are in Chicago, will meet in this city at a convention Oct. 20, 21 and 22, at Hotel Muehlebach. The organization has in view the betterment of merchandising accessories and correcting of existing abuses in the merchandising of accessories.

Denby To Teach Salesmanship

Free 36-Lesson Correspondence Course to Truck Buyers—Course Lasts a Year

DETROIT, MICH., Oct. 4—Something entirely new in the way of assistance or help to the purchaser of trucks has been inaugurated by the Denby Motor Truck Co. It consists in giving free to the Denby truck purchaser a correspondence course of retail salesmanship in thirty-six lessons, extending over a period of one year. The purpose of this business-building and sales-efficiency service is to develop, among the employees of every owner, at least one thoroughly efficient salesman, able to take advantage of the wider trade possibilities that the truck opens up.

The purchaser or owner of the truck is to designate whoever is to be given the lessons, preferably the driver, stating that it believes that he is usually the only man regularly out in the field, that he meets many customers who do most of their buying by telephone and that on his manner, appearance and methods is based the whole reputation of the store with many people.

The correspondence course is divided into four quarterly periods of nine lessons each, which are sent to the students at the rate of three a month. With every lesson there is a number of questions, which the student must answer and return to the Denby company, these answers having a bearing upon the awards of the various cash prizes aggregating $3,000 which the company has set aside to stimulate the interest of the students.

There will be one award or prize of $1,000 which will be paid Nov. 1, 1916, to the student who has shown the greatest progress, whether he has at that time finished the entire course or not. Four quarterly awards of $200 each will be paid to the student who has shown the most progress during the quarter, and there will be four prizes of $150 and four of $75, one for each quarter, to be given respectively to the second and third best students. In addition to these prizes $15 will be paid each month to the student ranking highest for that month and $10 to the one ranking second.

The lessons to be sent to the students will deal with such subjects as getting new customers, making old customers buy more, introducing new goods and many other subjects.

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Boston Dealers Show in Tents at Rockingham Fair

BOSTON, MASS., Oct. 2—Boston motor car dealers took advantage of the fall weather to make a big exhibit at Rock-

ingham Fair the past week. The show was held in two large tents placed together with the side flaps removed, making it one large area. The cars, trucks and accessories were spread around in a circle in each tent, and so one could look about without hindrance. All the Boston agents with exhibits had salesmen there, and the dealers in the border cities and towns on the New Hampshire-Massachusetts line were also on hand. The crowds were big, so the sales made and prospects secured were encouraging.

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Ward Electric on New York-to-Cleveland Trip

NEW YORK CITY, Oct. 5—To secure data on the cost of operating an electric vehicle over country roads, a Ward Special will be sent from this city to Cleveland during the Electrical Exposition and Motor Show at the Grand Central Palace, Oct. 6 to 16. The car will be started in time to reach Cleveland by Oct. 18, the date of the opening of the annual convention of the Electric Vehicle Association of America. The car will use the Edison battery known as the G4. The route to be followed will traverse Albany, Utica, Buffalo and Erie.

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Seventeen Car Makes at Denver Show

DENVER, COL., Sept. 29—The two weeks' fall show under the auspices of the Automobile Trades Association of Colorado has started favorably, with more than twenty exhibits, a good attendance and an excellent sales outlook. It is being conducted in the Automobile Building, one of the separate structures provided near the City Auditorium to furnish extra space for the International Soil Products Exposition, with which the automobile show is connected.

The event is being attended by thousands of visitors from a wide territory, many of whom are prosperous farmers and regarded as prospects for cars. A few sales were closed during the first three days of the show, and many more are counted upon. Seventeen cars are exhibited by ten dealers, and there are eight accessory and supply booths and one special exhibit presenting the work of the trades association.

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Conrad Bell Sales Manager

YORK, PA., Oct. 2—H. W. Conrad, former sales manager of the Pullman Motor Car, York, Pa., has been made the sales manager for the Bell Motor Car Co. W. F. Grove, who filled that capacity since the organization of the Bell company, has been made the factory superintendent. Work on the erection of the one-story frame assembling plant at the Bell factory is being completed and the several departments have been moved into the new addition. To further facilitate operations another addition, 110 by 30 ft., is being erected.

Ohio Jitney Drivers Organize

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Form Ohio Auto Bus. Assn.—To Fight Unfavorable Legislation in State

YOUNGSTOWN, OHIO, Oct. 4—The preliminary organization of the Ohio Auto Bus Association was finished at a meeting of jitney bus drivers held in this city last week. Local organizations in Akron, East Liverpool, Ashtabula, Lima, Marietta and Cincinnati were represented at the meeting. The object of the organization is to fight unfavorable legislation both on the part of the Ohio Legislature and various city councils. The next meeting will be held in Columbus.

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Jitney Bus Plan for Denver Practically Abandoned

DENVER, COL., Sept. 29—All efforts to establish jitney bus transportation in Denver have been fought so bitterly that the enterprise has been practically abandoned. Although there is now pending in court a mandamus suit to compel the city commissioners to issue permits for operating jitney bus lines, there is little hope that the jitney promoters will win the case, inasmuch as the applications for permits were originally rejected on the ground that a jitney bus line is a public utility the same as a street car line, and since the filing of the mandamus suit the jitney has been declared a public utility by both a city ordinance and a State law. Taxicabs require a city license costing $10 a year for cars up to seven-passenger capacity, and there is an ordinance providing for a $500 bond for each car, but this bond feature has not been enforced. The city has not fixed any license fee or bond requirement for jitneys, on the ground that a regular franchise must be secured. The jitneys have been opposed by both street car companies and taxicab concerns.

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Bullen with Michigan Top

DETROIT, MICH., Oct. 2—H. E. Bullen, formerly with the Rands Mfg. Co. is now in charge of the manufacturing department of the Michigan Auto Top Co., which has bought in the bankruptcy court the business and stock of the Michigan Auto Top & Painting Co. S. L. Joseph has been appointed to take care of the sales and financial department.

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Enforce N. Y. Jitney Bus Law

ALBANY, N. Y., Oct. 3—A decision has been rendered in this city which practically compels bus lines in all cities to get city and State permission to operate. The so-called jitney bus law has been sustained in all of its principal phases. As a result of the decision, the courts have held that the following classes of vehicles must secure the consent of the local authorities and go to the commission for a certificate of public convenience and necessity: A bus line, a stage route, a vehicle in connection with a bus line, a stage or motor vehicle route, a vehicle carrying passengers at a rate of fare of 15 cents or less for each passenger within the limits of a city, and a vehicle carrying passengers in competition with another common carrier, which is required by law to obtain the consent of the local authorities of said city to operate over the streets thereof.

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Cleveland Show Jan. 8-15

CLEVELAND, OHIO, Oct. 4—The fifteenth annual Cleveland automobile show will be held Jan. 8 to 15 in the Wigmore Coliseum. Dates and preliminary arrangements were decided on at a meeting at which was effected re-organization of the Cleveland Automobile Show Co., the dealers' organization which gives the show with the sanction of the Cleveland Automobile Club.

Fred H. Caley, who has managed the Cleveland show for four years past, was again elected to be in active charge. The Cleveland exposition comes immediately after the opening show in New York and precedes Chicago's by a week.

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Des Moines Show Feb. 14-19

DES MOINES, IOWA, Oct. 2—The annual Des Moines show, held previously during the month of March, is scheduled for the week of Feb. 14, 1916, according to an announcement by C. G. Van Vliet, secretary of the Des Moines Automobile Dealers' Association, who is manager of the local show. The new date, three weeks earlier than in former years, is better because it puts Des Moines on a circuit of the big automobile shows in the middle west.

The Minneapolis show will be held in the week of Jan. 29 and the Kansas City show in the week of Feb. 7, while the Omaha show follows the Des Moines exhibition during the week of Feb. 21. In former years the local date always conflicted with the Boston show and as a result many factory exhibits could not be shown.

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Lemoine Dies in Paris

PARIS, FRANCE, Oct. 1—M. Louis Antoine Lemoine died recently in this city at the age of sixty-two. He was the head of the automobile spring company bearing his name and was also president of the French Society of Makers of Motor Parts and Accessories.

Factory Miscellany

Elyria Tire to Build—The Elyria Tire & Rubber Co., Elyria, Ohio, will build a two-story 60 by 200-ft. plant.

Tayson Rubber Plant to Be Sold—The Tayson Rubber Co. plant, Wooster, Ohio, it is said, is to be sold to one of the large Akron tire concerns.

Pullman Leases 10,000 Sq. Ft.—The Pullman Motor Car Co., York, Pa., has leased 10,000 sq. ft. of additional floor space which it will occupy this month.

Milwaukee Engine to Add—The Milwaukee Auto Engine & Supply Co., Milwaukee, Wis., is preparing to enlarge its facilities and has increased its capital from $6,000 to $30,000.

New Ajax Plant—A new plant is to be built immediately by the Ajax-Grieb Rubber Co., Trenton, N. J., which will be 200 by 350 ft., three stories, and adding 210,000 sq. ft. of floor space.

Nashville Ford Plant Started—Work has been started on the three-story plant of the Ford company near Twelfth Avenue and Broadway, Nashville, Tenn. The plant will be 75 by 170 ft.

Gardner Machine Adds—The Gardner Machine Co., Beloit, Wis., manufacturing disk grinders for metal working, and supplying many car builders with its devices, is erecting a shop addition providing about 5000 additional square feet of floor-space.

Kelsey Wheel Adds—The Kelsey Wheel Co., Ltd., Windsor, Ont., has ordered the building of an addition, 42 by 112 ft., part of which will be a garage. The other part will be divided into six dry kilns.

Southern Tire to Double Capacity—The Southern Tire & Rubber Co., Augusta, Ga., will double its capacity, at present seventy-five tires per day. The number of employees, which is now fifty, will be increased to ninety.

Vandalia Co. to Make Accessories—The Midland Accessories Mfg. Co., Vandalia, Ill., has been incorporated with a capital of $150,000. The concern is a reorganization of the St. Louis Auto & Appliance Co. and plans to build a $50,000 plant at Vandalia.

Tire Plant for Sebring—A tire manufacturing plant, according to reports, will be placed in Sebring, Ohio, by the Sebring Tire & Rubber Co., recently formed with a capital of $200,000, with J. S. Hotchkiss, W. F. Smith, C. B. Smith, H. D. Weaver, and W. B. Stevenson as incorporators.

Tire Plant for Kansas City—P. E. Werner has leased a plant at Fourth and Central Streets and offices in the Commerce Building, Kansas City, Mo., to make tires. Actual production is expected to start about the first of the coming year. The company is also establishing a plant at Chester, W. Va.

New Linde Branch Plant—All contracts have been awarded for the erection of the new Milwaukee branch plant of the Linde Air Products Co., New York, and work is now well under way. The building will be of reinforced concrete and steel, to be 80 by 100 ft., and will cost $35,000. The location is at Thirty-eighth and National Avenues, West Allis, Milwaukee.

Sterling Truck Builds—The Sterling Motor Truck Co., Forty-sixth Avenue and Rogers Street, West Allis, Milwaukee, Wis., is building a large factory addition. The concern formerly was known as the Sternberg Motor Truck Co. It has been doing a large foreign business, and these demands, together with the unusually large business now being received from domestic sources, has made it necessary to nearly double the size of the works. The plant was erected only four years ago and was then expected to have a capacity for at least ten years.

The Automobile Calendar

Sept. 26-Oct. 10	Denver, Col., Show, International Soil Products Exposition. Automobile Trades Assn. of Colorado.
Oct.	Dallas, Tex., Show, Dallas Automobile Dealers' Assn.
Oct. 2-9	Cincinnati, Ohio, Show, Music Hall, Cincinnati Automobile Dealers' Assn.
Oct. 4-10	St. Louis, Mo., Show, Forest Park Highlands, St. Louis Automobile Manufacturers and Dealers' Assn.
Oct. 4-14	Wichita, Kan., Show, Wichita Auto. Dealers' Assn.
Oct. 6-16	New York City, Ninth Electrical Exposition and Motor Show at Grand Central Palace.
Oct. 9	New York City, Sheepshead Bay Motor Speedway 350-Mile Race.
Oct. 11-12	Dayton, O., National Paving Brick Manufacturers' Assn., Annual Meeting.
Oct. 11-16	Kansas City Dealers' Tour.
Oct. 12	Detroit, Mich., Hotel Statler S. A. E. Meeting for Detroit, Ind., and Met. Sections.
Oct. 14	Chicago, Ill., S. A. E. Standards Committee Meeting, Chicago Automobile Club.
Oct. 16	Chicago, Ill., 350-Mile Race, Chicago Speedway.
Oct. 16-23	Pittsburgh, Pa., Show, Motor Square Garden, Automobile Dealers' Assn.
Oct. 17	Twin City Speedway Match Race.
Oct. 18-19	Cleveland, O., Hotel Statler, Sixth Annual Convention, Electric Vehicle Assn. of America.
Oct. 18-24	Troy, N. Y., Show, State Armory, Troy Automobile Dealer's Assn.
Oct. 18-25	Los Angeles, Cal., Broadway Automobile and Flower Show, Automobile Dealers' Assn.
Oct. 20-21-22	Excelsior Springs, Mo., National Assn. of Automobile Accessory Jobbers' Meeting.
Oct. 21	New York City, Met. Sec. S. A. E. Meeting at Automobile Club of America.
Oct. 24	Fort Worth, Texas, Race Meet.
Oct. 25-27	Columbus, O., Garage Owners' Convention.
Oct. 29	Indianapolis, Ind., Claypool Hotel, S. A. E. Meeting of Ind. Section.
Nov. 1-3	Pasadena, Cal., Show, Hotel Green, Walter Hempel.
Nov. 12-20	Providence, R. I., Show, State Armory, Rhode Island Automobile Dealers' Assn.
Nov. 18	Arizona 150-mile Grand Prix.
Nov. 29-Dec. 4	Electric Prosperity Week.
Dec. 31	New York City Show, Grand Central Palace.

1916

Jan. 8-15	Cleveland, Ohio, Show, Wigmore Coliseum, Cleveland Automobile Show Co.
Jan. 8-15	Philadelphia, Pa., Philadelphia Auto. Trade Assn.
Jan. 22, 1916	Chicago, Ill., Show; Coliseum.
Jan. 24-29	Buffalo, N. Y., Show, Buffalo Automobile Dealers' Assn., Broadway Auditorium.
Jan. 29-Feb.	Minneapolis, Minn., Show, National Guard Armory, Minneapolis Trade Assn.
Feb. 7-12	Kansas City, Mo., Show, Convention Hall, Kansas City Motor Dealers' Assn.
Feb. 15-20	Omaha, Neb., Show, Omaha Automobile Show Assn.
Feb. 19	Newark, N. J., Show.
March 4-11	Boston, Mass., Truck Show, Mechanics Bldg.
May 13	New York City, Sheepshead Bay Speedway Race.
May 30	Indianapolis Track Race.
June 17	Chicago Track Race.
June 28	Des Moines, Ia., Track Race.
July 4	Minneapolis Track Race.
July 4	Sioux City Track Race.
July 15	Omaha, Neb., Track Race.
Aug. 5	Tacoma Track Race.
Aug. 18-19	Elgin Road Race.
Sept. 4	Des Moines Track Meet.
Sept. 15	Indianapolis Track Race.
Sept. 16	Providence Track Race.
Sept. 30	New York City Sheepshead Bay Race.
Oct 7	Omaha Track Race.
Oct. 14	Chicago Track Race.

The Week in the Industry

Newlin Transferred—W. D. Newlin, late of Kansas City, has been transferred to Springfield, Ill., and placed in charge of the Mitchell car as sales mananer for the Sangamon county territory.

Shay Champion Chicago Mgr.—W. J. Shay, recently with Judd & Leland Mfg. Co., and formerly with the United Manufacturers of New York, has become the Chicago manager of the Champion Spark Plug Co., Toledo, Ohio.

Keyt Heads Rockford Cadillac—The title of the Cadillac Automobile Co., Rockford, Ill., has been changed to that of the Keyt-Erb Automobile Co., of which F. P. Keyt is president; Clifford Erb, vice-president, and Walter Lamb, secretary and treasurer.

Gorman Cadillac Rep.—E. C. Gorman has been appointed a district representative for the Cadillac Motor Car Co., Detroit, Mich. He will travel Nebraska, Iowa, the Dakotas, Minnesota, and part of Canada. He was formerly in charge of the Cadillac exhibit at the Panama-Pacific Exposition.

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Dealer

Firestone Plant for K. C.—The Firestone Tire & Rubber Co., Akron, Ohio, will equip a tire plant at Kansas City, Mo., to cost $200,000.

Moline Sells Omaha Branch—The Moline Automobile Co., East Moline, Ill., has recently sold its Omaha branch to R. E. Davis & Co. The deal includes the entire State of Nebraska and western Iowa.

Recent N. Y. Leases—The Gadabout Motor Co., Freeman & Brady, the Holden One-Man Top Co., and the United Auto Co., recently leased space in the building at the southeast corner of Broadway and Fifty-seventh Street, New York City.

St. Louis Dealers' Items—Bart S. Adams, 4701 Washington Avenue, St. Louis, Mo., has obtained the agency for Midgley tires in the St. Louis territory.

The Commercial Auto Body Co. soon will announce a cut of from $10 to $25 on all commercial bodies. This reduction in price, according to Hugh F. Cartwright, president of the company, is due to decreased cost of production since the firm has occupied its new building at Sixteenth and Pine Streets.

The new Ajax tire sign being erected by the Guenther-Methudy Sales Co., 3553 Lindell Boulevard, is said to be the largest west of the Mississippi River.

Motor Men in New Roles

Henderson Seattle Mitchell Mgr.—J. A. P. Henderson is manager of the used car department of the Mitchell Motor Car Co., Seattle, Wash.

Baumann St. Louis Mgr.—The St. Louis Auto-Drayage Co., with W. H. Baumann as manager, has opened a repair and service station at 1907 Locust Street.

Taber in Charge—E. M. Taber has been placed in charge of the truck sales department of Russell P. Taber, Reo distributor at 338 Pearl Street, Hartford, Conn.

LeFebre Returns to Tacoma—R. P. LeFebre has returned to the Tacoma (Wash.) automobile field, and will be at the head of the sales staff of the Cadillac Auto & Supply Co.

Wright Saxon Sales Mgr.—F. S. Wright, formerly with the Studebaker Corp., has been appointed sales manager of the Saxon Motor Sales Co., with headquarters in Los Angeles.

Woodruff Lexington N. Y. Mgr.—A. A. Woodruff is manager of the Lexington Motors New York Corp., which recently opened showrooms at 1840 Broadway. Mr. Woodruff is also treasurer.

Morris Springfield Hudson Sales Mgr.—Merwin Morris is in charge of the sales of the recently organized Hudson Sales Co., Springfield, Ill. The salesroom and office will be at 428 South Fourth Street.

Ernst Metz Assistant Mgr.—N. F. Ernst has gone to Omaha, Neb., where he will be assistant manager of Metz branch there. He has been for three years branch manager of the Metz Co., Utica, N. Y.

Klune in New York—C. A. Klune has opened an office at 51 West Sixty-third Street, New York City, as a manufacturers' representative. He was formerly Eastern representative for the Jones representative.

Join Indianapolis Ford—Joseph Kelly and D. V. Goodman have joined the Indianapolis, Ind., branch of the Ford Motor Co., and will devote their time to sales promotion work, which comprises advertising and publicity.

Linerd Ajax Sales Mgr.—J. B. Linerd, who has been connected with the Ajax-Grieb Tire Co., New York City, for two years, has been elected general sales manager. Mr. Linerd came from the Goodyear company two years ago to reorganize the New York City office of the Ajax. As general sales manager of the New York company he will have the direction of all the salesmen of the company.

Taylor Succeeds Marty—E. A. Taylor has been made superintendent of plants 2 and 3 of the Maxwell Motor Co., Dayton, Ohio. Mr. Taylor succeeds William Marty, who has resigned to become superintendent of plant 2 of the Studebaker Corp.

Whitney Los Angeles Sales Mgr.—R. A. Whitney, who has been identified with the Regal line in Southern California, has been appointed sales manager of the Colyear Motor Sales Co., newly appointed Regal distributor for southern California and Arizona.

Erickson Joins United Truck—F. E. Erickson has joined the United Motor Truck Co., Grand Rapids, Mich., in the capacity of general superintendent. Mr. Erickson was formerly with the Packard Motor Car Co., and later with the Universal Motor Truck Co.

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Dealer

Opens Detroit Office—The General Drop Forge Co., Buffalo, has opened an office in the David Whitney Building, Detroit, Mich., in charge of E. H. Miller.

Bristol Dealers Make Trip—Thirteen Bristol (Tenn.) automobile dealers on Sept. 23 made a 300-mile trip to Knoxville, Tenn. The Paige, Oakland and Maxwell cars made perfect scores.

Ford Buys in Yonkers—The Ford Automobile Co. has purchased the building at 109 to 115 South Broadway, Yonkers, N. Y., and will erect a concrete and brick salesroom, garage and repair shop.

New Accessory House in Columbus—The W. E. Cody Sales Stable Co., Columbus Co., Columbus, Ga., has installed an automobile accessory department, both wholesale and retail, and will have the agency for the Firestone and Diamond tires in that territory.

Montana Garage News—New garages are to be erected in Montana cities showing growth in business as travel over the new automobile trails increases. The Ford company has taken a lease for five years. At Livingston Senator A. W. Milles will erect a brick and concrete garage in the heart of the city which is to be 75 by 140 ft. At Billings, the Barry Motor Co. has the wholesale and retail distributing agency in Montana and northern Wyoming for Oakland cars.

Recent Changes in Louisville—The Samson Engineering Co., Louisville, Ky., has moved its offices from the Snead Building to the Starks Building.

The Compression Inner Tube Co. has opened an office and salesroom at 662 South Fourth Street.

Handles Handy Carbon Remover—The Perfek Device Co., Baltimore, Md., 116 South Greene Street, Baltimore, is now handling locally the Handy, a device for cleaning carbon out of cylinders. The company also is the Eastern distributor of the Perfek steering device.

Baltimore Co. Moves—The Randall Manufacturing Co., Scripps-Booth, Trumbull and Bell distributors, is taking possession of its new quarters, 16 West Mount Royal Avenue, Baltimore. The company will maintain a service station in the rear of the showrooms and offices. W. D. Randall is at the head of the company.

Recent Wis. Trade News—John Luke, who has been conducting a garage and repair shop in the Wagner foundry group at Burlington, Wis., for some years, has formed a partnership with A. H. Voltz. The new firm of Luke & Voltz has leased the Forge garage building at Burlington and will build an addition to be used for repair shop. A complete new equipment of tools will be installed in the building.

James E. Dempsey, formerly of Manitowoc, Wis., has returned to that city from the Pacific coast to arrange for the manufacture of a dirigible headlight device controlled by the action of the steering gear. Mr. Dempsey has patented the device in the United States, Canada, France and other foreign countries.

The Ph. Gross Hardware Co., 218-222 Third Street, Milwaukee, operating one of the largest motor supply departments in the State, has been appointed Wisconsin distributor of the American Ever Ready Works, New York.

E. H. Ramm, hardware dealer, New London, Wis., who has been appointed district agent for the Ford, is building a garage addition to his store and warehouse and will also conduct a repair shop and service station.

Frederick Glines, Omro, Wis., has leased the Leighton building and is remodeling it for garage and repair shop purposes. Mr. Glines has been appointed agent for the Ford.

The stock, machinery and equipment of the Rex Gasometer Co., Beloit, manufacturing measuring devices for gasoline tanks, oil tanks, etc., has been sold to satisfy the demands of creditors.

A. D. Whipple, Frank L. Bader and Christian Doerfler have organized the Transmission Research Co., Milwaukee, with $25,000 capital, to deal in patents; develop inventions and manufacture devices. Messrs. Whipple and Bader have been engaged in design for many years and now intend to market a number of important inventions in the automobile field.

The Estberg Garage, 460 Jackson Street, Milwaukee, established about eight years ago by Emil Estberg, has been sold to C. Ducey. Mr. Estberg will devote his attention to the sale of the Oldsmobile, Chevrolet and Monroe.

The Reo Sales Co. has been organized at Eau Claire, Wis., to handle the Reo pleasure and commercial car in a large northwestern Wisconsin territory. The agency formerly was handled by the Taylor Motor Co., Eau Claire. The members of the new firm are O. G. Kinney, Colfax, Wis., and J. C. MacDonald, Eau Claire. Headquarters have been established at 701 South Barstow Street.

The Bartles-Maguire Oil Co., Milwaukee, one of the largest independents in Wisconsin, will build a large filling station at Twenty-seven Street and Grand Avenue for the accommodation of motorists. The Standard Oil Co. recently built a large station at Grand Avenue and Sixteenth Street.

Denver Trade Items—The Boss Rubber Co., 1548 Broadway, Denver, agent for Kelly-Springfield tires, has been reorganized. S. Z. Silversparre, a member of the firm for several years and recently president of the company, has sold his interest and moved to El Paso, Tex.; F. P. Lilley, formerly vice-president, has been made president; Arthur Lewis, formerly manager of the Salt Lake City branch, is vice-president, while H. G. Peters and Robert Rhea still hold their respective offices of treasurer and secretary.

J. M. Patrick, 1515 Cheyenne Place, Denver, Lewis distributor for Colorado and Wyoming, has just secured the agency for the Abbott-Detroit.

The Ford Motor Co. has closed its downtown salesroom at 1551 Broadway, Denver, and will handle all regular city sales from the assembling plant at South Broadway and Kentucky Avenue.

The Denver Ford Starter Co., 1522 Cleveland Place, manufacturer of a mechanical starter, has taken the agency for the H. & D. shock absorber in that city.

J. M. Patrick, Lewis distributor, Denver, has moved from 533 Marion Street to 1515 Cheyenne Place, where he is occupying the salesroom recently vacated by L. G. Palmer, formerly Paige distributor.

L. E. Kelton, Haynes distributor, has moved from 1616 Broadway into permanent quarters at 1622 Broadway.

A. C. Wagner, proprietor of the Wagner Garage, 1541 Cleveland Place, has taken the agency for the Denby truck.

The firm of Mulnix & Steese, 17 East Colfax Avenue, Grant distributors, has been changed to Mulnix & Rarie, the interest of Mr. Steese having been bought by Baxter Rarie, formerly Grant distributor for northern Colorado, with headquarters at Loveland.

The National Rubber Supply Co.'s Denver branch has moved from 1633 Broadway into larger quarters at 1629 Broadway.

Recent Cal. Trade Items—B. L. Remington and W. L. Maxwell, 38-40 East Miner Avenue, Stockton, Cal., have formed a partnership under the name of the Guarantee Ignition & Battery Co. They will specialize in starting systems for all makes of cars.

The Stockton Auto Ignition Co., representing the Willard storage battery, is erecting a new concrete building on Miner Avenue, Stockton. The company recently received the local agency for the Splitdorf and Bosch magnetos.

Bell & Hinman have purchased the Twelfth Street Garage, 516 Twelfth Street, Sacramento, and will specialze in used cars.

The Traveler's Garage, 521-523 First Street, has been opened by Sellinger & De Gastin, Inc., in Sacramento. The company recently received the Haynes agency.

J. E. White has opened a Mitchell salesroom and service station at 1106 K Street, Sacramento.

The Universal Specialty Co., Los Angeles, has opened a tire construction and vulcanizing plant at 1237 South Figuroa Street.

The Big Tree Auto Works, the oldest garage in Los Angeles, has moved into a modern brick building at 1732-40 West Washington Street. The proprietors have been in business in Los Angeles twenty-eight years.

The Los Angeles branch of the Savage Tire Co. has moved into the large brick building at 700 West Seventh Street. In the new building the company has room for 5000 tires and a large office and shipping force.

Washington Electric Agent Builds—Emerson & Orme, Washington, D. C., agents for the Detroit electric, have commenced the erection of a two-story fireproof building to contain salesrooms, service station and garage. It is located on M Street, between Sixteenth and Seventeenth Streets, and will have a frontage and depth of 135 ft. On the first floor there will be a salesroom, 44 by 54 ft., for new cars, and a salesroom, 19 by 54 ft., for second-hand cars. Offices and a waiting room will be located on the main floor, together with a large garage. The charging plant will be located on the second floor. Provision has been made for a third story at some future time. The building will be completed in January.